

THE
MEDICAL JOURNAL
OF AUSTRALIA

VOL. I.—10TH YEAR.

SYDNEY: SATURDAY, MARCH 10, 1923.

No. 10.

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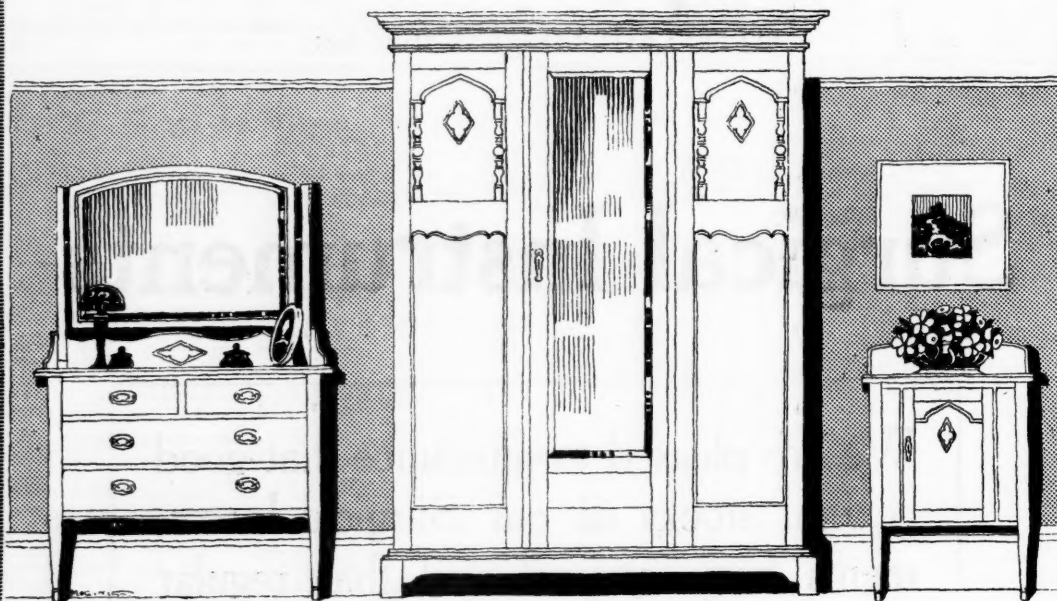
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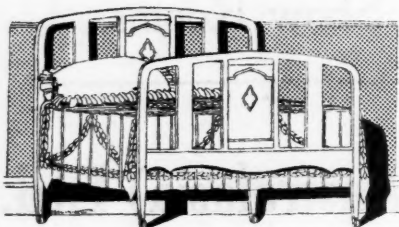


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RECENT PROGRESS IN CHILD HYGIENE.¹

By HARVEY SUTTON, O.B.E., M.D., B.S. (MELBOURNE),
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Introductory.

THE health control of childhood is rapidly assuming a position second to none in the whole range of public health. Progress has been both rapid and recent and a review of certain modern developments may be opportune. As New Zealand undoubtedly leads the world in infant care and management, I propose to turn my attention* to the period from the third to the eighteenth year—from toddler to adolescent—the main years of which, six to fourteen, fall within the school period.

In contrast with the nineteenth century, whether in legislative control, administrative activity or educational propaganda, concentration nowadays is upon the human factor. It must not be inferred that is a criticism of the nineteenth century, for

the rise of humanitarian ideas which characterized the Victorian era, was the natural step towards the practical application of health principles to the human being.

The English Act of 1875 is our first great milestone in health progress. With it came a control of the external conditions, the environment which developed a sanitary conscience in civilized communities. From that date comes the rapid modern progress “which has lengthened life by over ten years on the average, reduced child mortality and tuberculosis death rate to one half, caused the scourges of typhus and small-pox to become either extinct or rare and typhoid, wherever practical sanitation is organized, to be a vanishing disease.” Further, it has not perhaps been realized that the virulence, the dangerous character of disease-producing germs has in certain instances been greatly and perhaps permanently modified. Measles, whooping cough and scarlet fever, although still serious dangers to child life between one and five years, are nothing like the death-dealing menaces of 1840-1875. Scarlet fever in particular has been stripped of its terrors.

Contrast the figures of actual deaths for the State of Victoria during the ten years 1867 to 1876 with the first ten years of this century, 1901 to 1910:

¹ The Presidential Address read before the Section of Sanitary Science and Hygiene at the Sixteenth Meeting of the Australasian Association for the Advancement of Science, Wellington, New Zealand, January, 1923.

Disease.	Incubation Period.	1867-1876.	1901-1910.	Reduction.
Scarlet Fever	1 to 4 days	5,025	165	One-thirtieth
Measles	12 to 12 days	2,495	272	One ninth
Whooping Cough	18 to 21 days	1,674	1,161	Two-thirds

Two explanations are possible and probably both count. In the first place, the isolation of the sick and quarantine of contacts is efficacious, chiefly because the time between infection and the development of sickness (the incubation period) is short and also because scarlet fever and measles are more easily recognizable. The rash of scarlet fever and of measles enables them to be picked out, while diphtheria and whooping cough may escape early recognition. The second reason is that, although measles, if all cases are reckoned, is still very frequent, attacking three-quarters of the child population at least, the external surroundings have been so improved as to diminish greatly the deadliness of the germs at work.

In any case, the life saving these figures represent is a veritable triumph for our sanitarians of the Victorian era.

The human factor has attained its prominence because of recent discoveries. Florence Nightingale, like many nowadays, believed disease, small-pox, typhoid *et cetera*, arose in the beginning from faulty sanitation. We know now, thanks to the bacteriologist, that the common diseases are infections due to specific germs, special to the disease type they produce. These germs may or may not exist outside the body, but they have their essential focus in human beings. While external carelessness is the necessary link, it is human pollution, however, that really counts, *exempli gratia*, in water impurity. It is the human being with diphtheria, meningitis, syphilis, who is essential to the occurrence of the epidemic. Most remarkable again is the convicting of certain healthy people as "carriers," people who have either recovered long before from the disease or who have been recent contacts and yet harbour dangerous organisms and spread the disease.

Nevertheless, the fight against overcrowding in dwellings, against dirt inside and outside the house and the insistence on fresh air and sunlight, have been intensified and proved even more important by the bacterial revelations of the danger of "spray" or "droplet" infection or of infection by saliva, as in the common cup. The desire for individual articles, which previous generations thought a fad, bacteriology has proved an essential need. It is the frequency with which healthy carriers occur in the general mass of the population that has proved this. While we have abandoned the old ideas of chemical impurity of air, we only insist the more on a free air supply, moving and cool, by amplifying and not reducing the ventilatory requirements.

Bacteriology has made possible a clearer and more exact knowledge of the particular modes of a spread favoured by each disease and so we are able to specialize our methods of attack. Most recent has been the accusation of various insects as vectors of infection, whether mechanically, as in the

fly, or by infection through biting, as in the mosquito.

The ability to defy tropical climates has come in this way by the cooperation of the entomologist. The areas known as "the white man's grave" on the Gold Coast of West Africa now are health resorts. With this, too, has, I believe, come the possibility of improving rural settlement. Insect lore, such as the study of the life history of the fly, gives us the key to field sanitation in warm climates like New South Wales. "No system of sanitation is satisfactory that permits the contact of flies with infective material." Again, we have, as evidenced in the fight against the rat, the complete justification for the insistence of cleanliness, both inside and outside the house. The proper collection and disposal by burning and so forth of every form of refuse, liquid or solid, domestic, kitchen, animal, human, is thus demanded to prevent fly-breeding and fly-carriage of digestive infections.

In the last twenty years, the belief in prevention has caused a change in the whole attitude towards the human being itself. Most civilized communities have made provision for the end of life, the care of old age, but we now realize that true humanity requires control of the human being in the making. The advance is now in the direction of maternity and child welfare; and conservation of child life, of the human being in the formative period, is giving the best results at the least expense of money and effort. The great systems of school hygiene which now control hundreds of thousands of children within the Empire have all arisen in this century with inestimable benefit to our future citizens. Recent advances have been in certain directions.

District Incidence of Disease.

An attempt is being made to introduce a district or zone attack on defect and disease.

Hookworm.

The International Health Board of the Rockefeller Foundation, with the cooperation of Commonwealth and State Governments, brought about the Hookworm Campaign, which has demonstrated a definite incidence of hookworm, namely, 6% in the children of the north coast area. The incidence is heaviest in the aborigines and in the barefoot ages of five to eighteen years. It is closely associated with field insanitation and the belts of heavy rainfall, such as one hundred and twenty five centimetres (fifty inches) or so. The southern limit is in the neighbourhood of Kempsey, Newcastle being virtually free from the infection.

The work, though carried out by an independent team, closely concerns school life, school children forming a convenient cross-section of the population which is most heavily infected. They are most amenable for education in the school and most easily

reached for home treatment through the schools. Further, the chronic ill-health, irregular attendance and retardation associated render the campaign important in educational work. A full-time school nurse assists in home visiting and school medical officers help in propaganda work and in the collection of specimens.

Simple Goitre.

Simple goitre is universally characterized by its endemic selection of special districts. We are now in course of completion of a map of goitrous districts.

This investigation so far represents over a year and a half's work and in the rural districts deals with 75,000 children (more than half the number of children), chiefly those from six years to fifteen years of age. In addition, 10,000 metropolitan children have been dealt with.

Seven rural medical officers carried out the observations and the personal factor naturally entered into its recognition, especially of the mildest cases. The more marked cases with definitely abnormal swelling of the gland, with or without symptoms, have been notified to parents, who have been advised to consult a doctor, and the standard for these is more definite and uniform.

Two preliminary conclusions are to be drawn from the figures:

In the first place, they prove the existence of goitrous districts, where simple goitre occurs in girls in percentages ranging from 1½% to 3% or 4% or even 11% or 12%. In non-goitrous areas, thyreoid enlargement rarely occurs in more than 1% of girls.

In the second place, they show the great importance of goitre in boys. Simple goitre in boys is very

rarely seen outside goitrous districts, but in goitrous areas at least 5% as a rule are affected. The percentage may rise to over 6%. The more goitrous the area, the higher in proportion to the girls is the incidence in boys, rising from one in thirty in the less goitrous districts to one in two where the incidence is heaviest.

The map is intended as a guide to further investigation of the underlying causes and possible preventive treatment. Goitre in New South Wales corresponds to Victorian experience in being found in certain districts and in scattered foci in those goitrous areas. Water supply has always been suspect. Inquiry points to tank water as the chief source, to waterholes occasionally and sometimes to an unregulated municipal supply. It does not appear to occur in any frequency in towns or cities with properly controlled supplies, except as imported instances, nor is it a feature in our artesian areas. Hot, dry plains are very free from it and the seaports, while the full incidence appears closely associated with the hilly areas just off the tablelands and to some extent on the tableland itself, where the rainfall is plentiful and summer rains the heaviest. The geological association appears confusing, though the palæozoic, such as the carboniferous, silurian and devonian predominate.

It is interesting to review the findings in the light of the two main theories of goitre causation. There is on the one hand the view that goitre is due to deprivation of iodine and possibly also of calcium. The other theory, as enunciated by McCarrison, regards infection as the causative factor. Tank water is certainly free from iodine and, curiously enough, inquiries in regard to these children seem to point to a water drinking habit and a distaste for milk and

INCIDENCE AND NOTIFICATIONS OF GOITRE.

District.	Incidence per 100		Number Notified.	
	Boys.	Girls.	Boys.	Girls.
Tamworth	1.53	5.43	28	100
Muswellbrook .. .	1.63	5.56	26	88
Armidale	0.06	1.22	1	19
Maitland	0.11	0.66	5	31
Albury	—	0.65	—	10
Casino	0.28	0.54	3	6
Grafton	0.14	0.51	1	3
Campbelltown .. .	0.17	0.44	4	9
Newcastle North ..	0.08	0.24	3	8
Inverell	—	0.20	—	3
Newcastle South ..	0.04	0.11	1	3
Yass	—	0.10	—	2
Braidwood	0.09	0.09	1	1
Taree	—	0.08	—	1
Narrabri	—	0.08	—	1
Goulburn	—	0.08	—	1
Lismore	—	0.04	—	1
Bathurst	—	—	—	—
Young	—	—	—	—
Kempsey	—	—	—	—
Bega	—	—	—	—
Total	0.19	0.78	74	287

INCIDENCE, NUMBER EXAMINED AND CASES OF GOITRE.

District.	Incidence per 100.		No. of Boys.		No. of Girls.	
	Boys.	Girls.	Ex'd.	All Cs.	Ex'd.	All Cs.
Tamworth	6.33	12.00	1,817	115	1,841	221
Muswellbrook .. .	5.50	11.27	1,590	88	1,578	177
Grafton	0.42	4.35	702	3	577	25
Armidale	0.76	3.57	1,703	13	1,568	56
Maitland	0.57	3.01	4,347	25	4,101	149
Campbelltown .. .	0.77	2.60	2,343	18	2,015	53
Newcastle North ..	0.57	2.28	3,725	22	3,378	77
Newcastle South ..	0.23	2.19	2,950	7	2,606	57
Yass	0.48	2.03	1,874	9	1,871	38
Albury	0.06	1.95	1,563	1	1,535	30
Casino	0.47	1.80	1,055	5	1,106	20
Braidwood	0.09	1.74	1,039	1	1,034	18
Lismore	0.18	1.59	2,177	4	2,137	34
Young	0.00	1.14	1,874	—	1,833	21
Bathurst	0.00	0.87	2,001	—	1,969	17
Taree	0.31	0.88	1,272	4	1,252	11
Kempsey	0.00	0.61	1,092	—	986	6
Goulburn	0.00	0.60	978	—	1,166	7
Bega	0.00	0.30	1,301	—	1,002	3
Inverell	0.00	0.28	1,518	—	1,463	4
Narrabri	0.00	0.17	1,287	—	1,197	2
Total	0.06	0.24	38,207	228	36,045	905

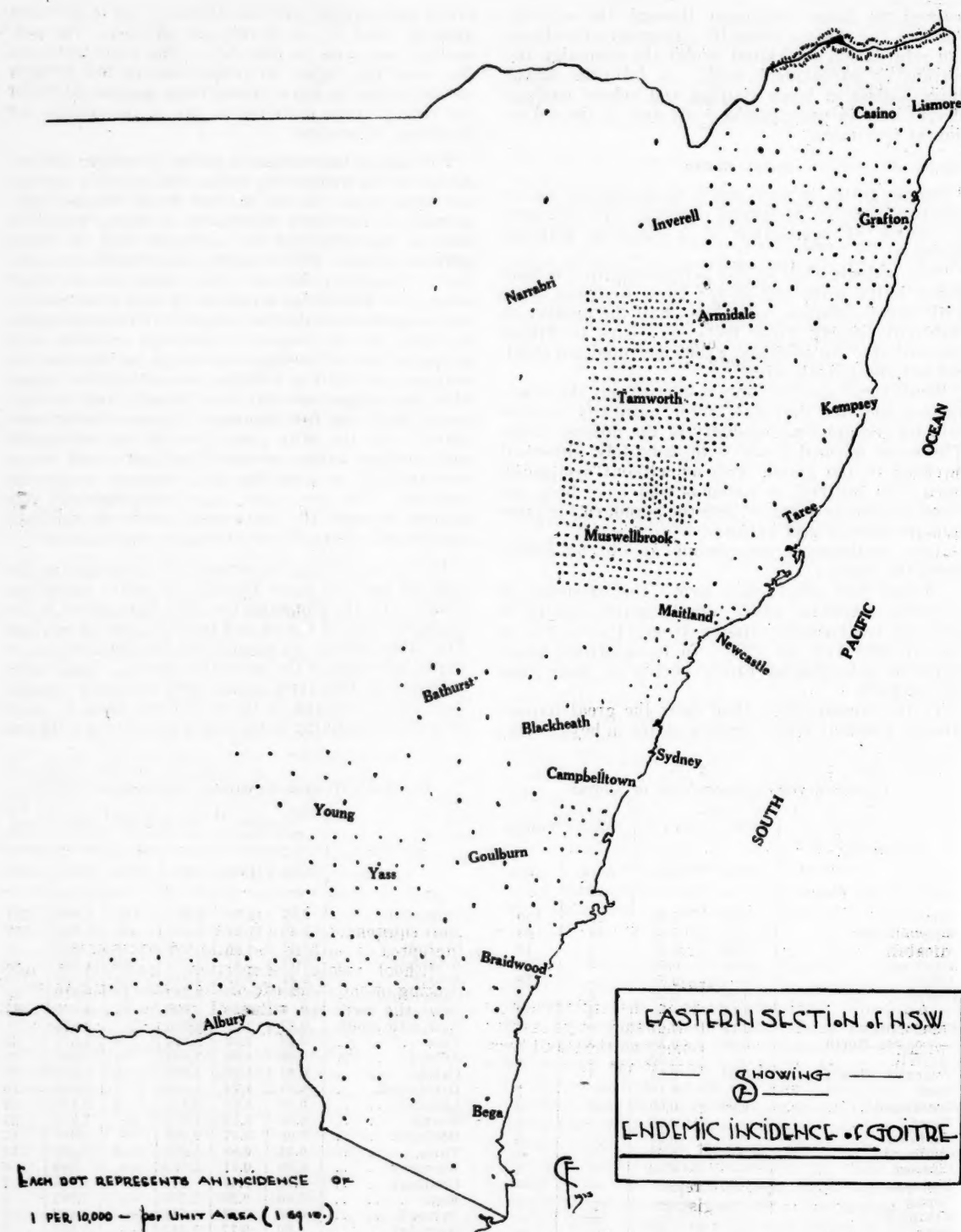


FIGURE I.

tea. On the other hand, tank water may become infected from the roof catchment. This would not occur to any extent in the hot, dry areas, where the sun's rays sterilize the roof dirt, but would be most likely to occur under the climatic conditions already described; climatic conditions characterized by plentiful and frequent rainfall in summer, but accompanied by diminished chemical action of sunshine, owing to humidity and contour.

The proposal is to try out in some selected area or areas one or all of three methods: The periodic administration or feeding, firstly, of sodium iodide and, secondly, of "Iodecin" by the mouth or, in the third place, the sterilization of water in tanks with some simple disinfectant, leaving a soluble iodide in the water. The experience in Michigan and in Switzerland points strongly to the value of iodide treatment.

Direct Supervision of Health.

Attempts are being made to establish a more direct and personal health supervision over the health of high school girls, of teacher students in training and, finally, of the teachers of the service.

Medical examination is now compulsory in high schools, on entrance to the teaching service, in certain conditions of sick leave and in all questions of retirement.

Over-pressure in high schools is receiving special attention and appears referable in the small percentage in whom it occurs to gross interference with the quantity and quality of sleep, to failure to take regular daily open-air exercise, to casual meals and to faulty selection of food. Too often the keenness of the ambitious and over-conscientious girl to over-work is aided and abetted by the anxious parent, while the fear of the examination, especially the internal school examination, is the root of all the evil.

In the examination of teachers it seems desirable that a change in the nature of the examination should be made from a mere life insurance type required by superannuation privileges, to one eliminative of individuals unfitted for teaching by their liability to break down and to suffer from anæmia, neurasthenia, mental depression, tuberculosis and hyperthyroidism, which form our most wide-spread disabilities in women teachers.

Delinquency.

An advance has been made in the exploration of that most difficult field of delinquency in connexion with the Children's Court. Some two thousand boys, usually thirteen to fifteen years of age, pass through this court every year for minor offences—a most important, unfortunate and extraordinary collection of individuals. We are now able, through the co-operation of the State Children Relief Department, to follow them up to the institutions to which they are committed. The medical report is being utilized more and more by the magistrate before committal.

The findings for the past year are suggestive. Seven hundred and seventy-seven boys were examined from a physical standpoint and four hundred and seventeen were subjected to mental tests. Of the latter group, 16.2% were mentally above the age level, 24.2% showed moderate mental activity,

37% were dull, while 21.5% were distinctly retarded. The last group of 21.5% was composed of 0.5% who were very backward, 9% who were subnormal and 3% who were definitely so. In other words, 12% of the original four hundred and seventeen were suited only for education in a special school. Such a finding is at least eight times worse than in a city school population. For much of the retardation, however, a physical and not a purely mental origin must be sought. Thus, hearing was defective in 5%, vision in 7.4%, abnormalities of the throat and nose were present in 27%, malnutrition and anæmia were discovered in 18% and genital precocity was noted in 16%. These figures are approximately twice as bad as those of the city average. Sex aberration and sex inversion appear to be common findings.

While it must be acknowledged that home environment and parental failure provide the opportunity or incentive to anti-social behaviour, still the physical and mental make-up of the boy is the predisposing factor and such aberrant growth is finally to be referred to ill-balanced endocrine control.

Growth.

Just as the missionary is claimed as the life blood of the churches, so investigation is the real vital centre dominating our progress in health control. The pendulum of interest is swinging from the negative aspects of death, disease, disability, defect and dirt to the more glorious positive aspects of perfect health, complete functional efficiency, habitual cleanliness, practical idealism, common-sense ideas, rational customs and the joy of living.

The fundamental phenomenon at the very base of all work in children is growth. School medical inspection asserts as its primary duty the elimination of those defects which may interfere with educational progress or with healthy development, in other words, growth in mind or in body.

Childhood may be defined as the period of growth. In infancy the weight chart has supplanted the thermometer and the scales have proved to be our greatest life-saving instrument.

At the school age the weighing machine is rapidly attaining its proper position as part of the essential equipment of every school. It has already been accepted as such in the infant departments.

School medical inspection represents a stock-taking of the child life of the school community. It has the peculiar value of presenting a virtually complete cross-section of the whole population at the school age. Hence its statistical value is excellent and free from the objection to the selected and limited groups of hospital and ordinary medical experience.

Standards must be established in dealing with the infinite variations from the normal and to define the term "defect." Above all, the normal must be defined. The defects we object to are just those which retard mental or physical growth or both. Hence growth is the essential test and measurement an immediate need. Mental development may be crudely stated in terms of age and grade, aided by the teachers' estimate of mental capacity—bright, moderate, dull, backward *et cetera*—or still more subtly, independently and efficiently by the intelli-

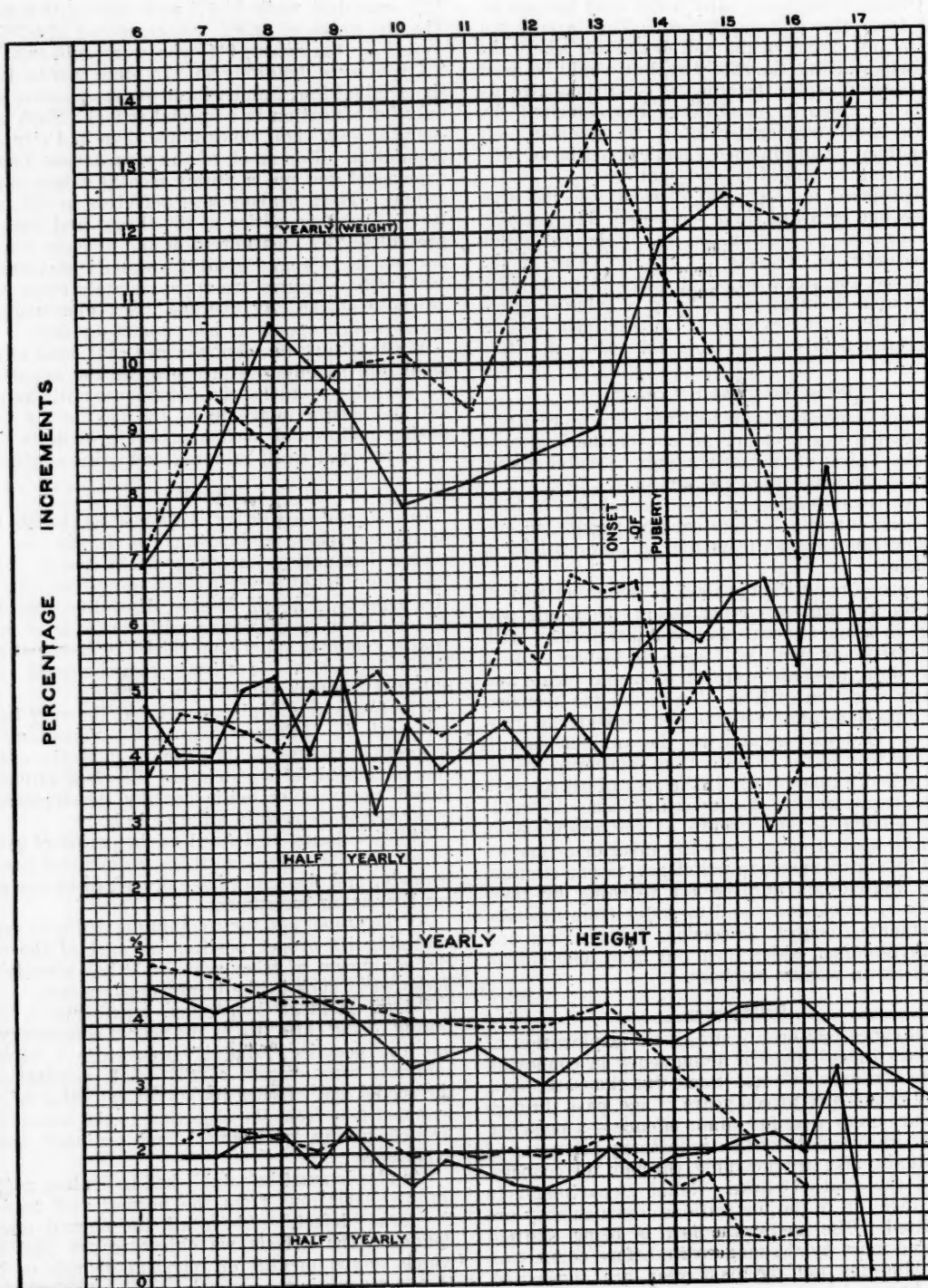


FIGURE II.

Graph Illustrating Rate of Growth. Upper Curves: Yearly and Half-Yearly Increment in Weight. Lower Curves: Yearly and Half-Yearly Increment in Height. Continuous Line: Girls. Interrupted Line: Boys.

gence quotient, *id est*, the actual mental age, divided by chronological age multiplied by one hundred, the mental age or level being ascertained by means of the Binet test, assisted by the Porteus test or other performance tests.

Incidentally it may be noted that in estimating the grosser forms represented by mental deficiency we should employ a complete life-study of the individuals, as exemplified in Fernald's ten fields of inquiry, including hereditary history and reaction to social and educational environment, as shown in conduct and behaviour.

Personally, I consider much light could be thrown on the problem of mental development by a consideration of the physical or anatomical age and further correlation with the evidences of endocrine activity.

Physical development and growth are peculiarly amenable to investigation and record. Even an isolated weighing and measuring gives an excellent standard for testing nutrition, further reinforced by periodic monthly weighings where possible.

The great problem of the present day is malnutrition. We may describe malnutrition as the failure of physical growth, represented by a disproportionately small amount of the fleshy organs as compared with the bony skeleton, often combined with inadequate growth of the skeleton itself.

Malnutrition is the key to the problem of tuberculosis; indeed, just as typhoid is our test of municipal sanitation, so tuberculosis is the test of national nutrition.

Our test will therefore be threefold. In making our test we shall consider the relationship of weight to height, independent of age, the comparison of stature per age and the periodic increase of weight (and stature).

Taking weight per height as our chief test, we regard a 5% deficiency as probable and 10% deficiency as *prima facie* evidence of malnutrition. Correlated with this numerical estimate we are guided by the degree of anæmia, as shown by pallor of lips, cheeks, eyelids and gums, emaciated appearance, flabbiness of muscles, general impression of "dopiness" or of vigor as shown in spinal curves, facial expression *et cetera*.

In New South Wales the measurements of over 100,000 boys and over 100,000 girls have been carefully collected by our statistician, Mr. Mecham, and we now have standards of the average (normal) amount of growth, weight and height for sex and age (in half years), together with the differences found under the varying environments of metropolitan, urban and rural conditions and the racial influence of degree of Australianness.

For example, the rural child outgrows in height and weight the country-town child and he again the metropolitan school pupil, while the more Australian the child is the better the specimen, those with Australian born parents exceeding those born in Australia of overseas parents and so on.

Although when compared on an age basis, the rural child is taller and heavier than the city child, a graph of weight per height, independent of age, is identical for both. They both run along the same track, the rural child out-speeding the other.

Hence the normal height-weight relationship holds good, independent of age and district. The sex differences, which are marked when the age factor is introduced, are of quite minor importance till the age of puberty.

The application of this useful test of nutrition is thus greatly simplified and its value intensified.

Stature in itself is of far less importance as regards nutrition and health than the height-weight relationship. Nevertheless, its study, together with that of the bony skeleton and the bodily proportions, give valuable information.

In the first place, the maturity or immaturity of the skeleton, combined with the proper dental eruption, is helpful in determining anatomical age, the best scientific estimate, of course, being that of the disappearance of the various ossification centres in the wrist *et cetera* as demonstrated by Roth. Anatomical or anatomico-physiological age should be the test for admission to industrial work and not the birth certificate showing the chronological age.

Secondly, the disturbance of bony growth in the region of the epiphyseal line furnishes much of the evidence of previous rickets, perhaps the most important nutritional disturbance of early life and the basis of school deformities.

In the third place, the skeletal proportions are much more variable and their variations are much more important than has so far been recognized.

We are familiar with the normal proportions set out by Stratz of the four heads height at birth, five heads at two years, six heads high at six to nine, seven heads at twelve to fifteen and eight heads in the fully grown adult. But of still greater importance is the degree of vertebral growth.

While the head height drops from one-quarter to one-eighth, the legs (pubis or mid-trochanter to ground) increase from three-eighths to one-half and the spinal length remains proportionately about the same.

In addition to total stature, the estimation of sitting height is advisable, for it is closely related to spinal growth. Spinal length is readily estimated by measuring in front from the lower edge of the orbit above to the upper margin of the pubis below, at the side from the great trochanter to the upper edge of the malar bone or the opening of the ear and behind from the occipital protuberance above to the coccyx below (or mid-curve of the buttock). Sitting height adds half the skull height and the ischial tuberosities and is thus a fair approximation.

It is a closer representative of body, *id est*, trunk length, which is independent of limb length and has been shown to be closely correlated to body surface and to intestinal length or area for absorption of nourishment and thus to caloric requirement.

Total stature, which includes the lower, but not the upper limbs, is thus a less useful measure. For educational purposes, for example, suitable desks are or should be decided by length from knee joint to ground for the seat height, half the thigh length for the seat width. Sitting height gives these by simple calculation. Height of seat is equal to the total stature less the sitting height.

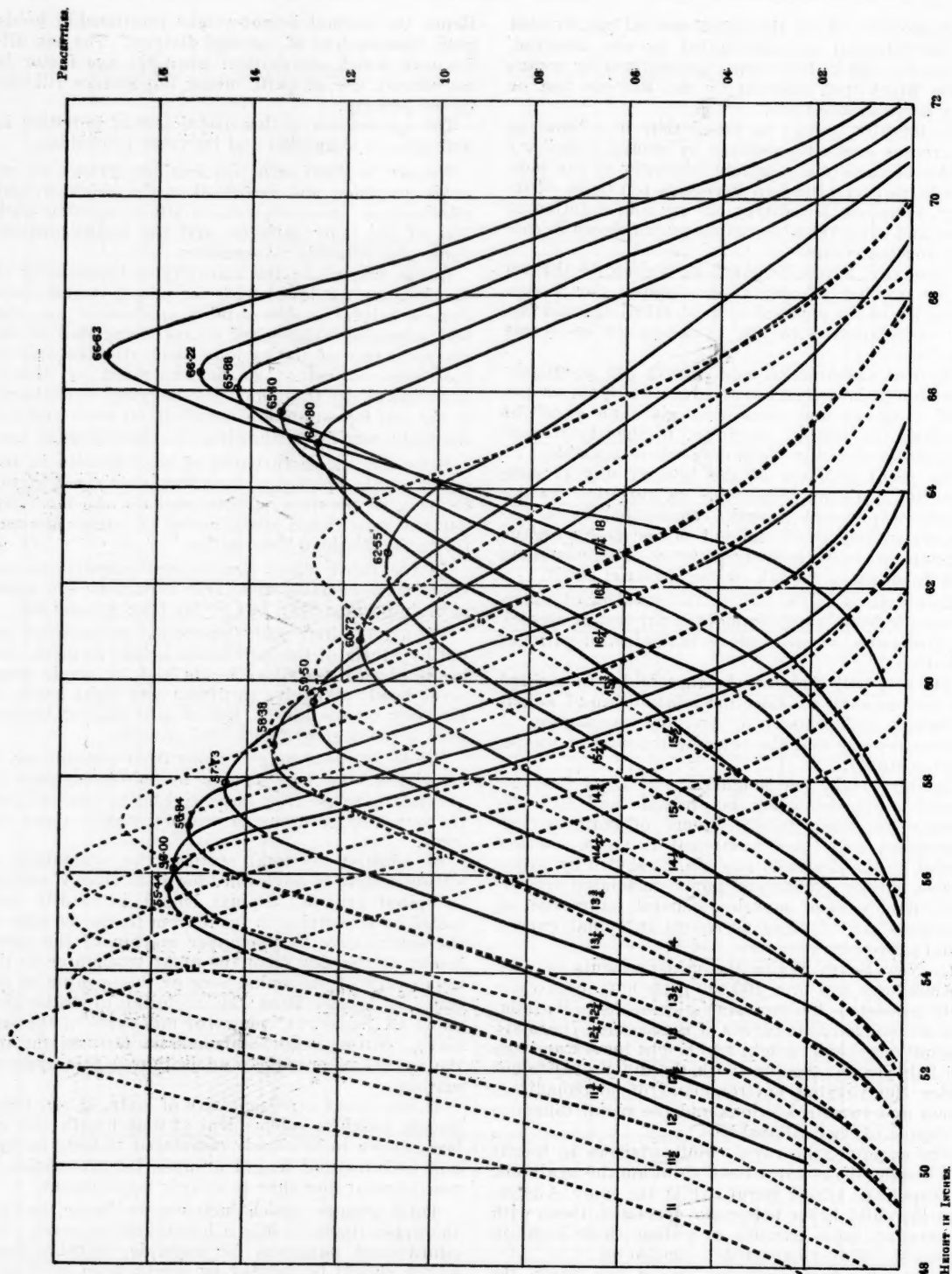


FIGURE III.

Graph illustrating Proportionate Distribution in Each Age Group According to Height in Inches: Continuous Line: Common-wealth Cadets. Interrupted Line: Sydney Boys.

Graph

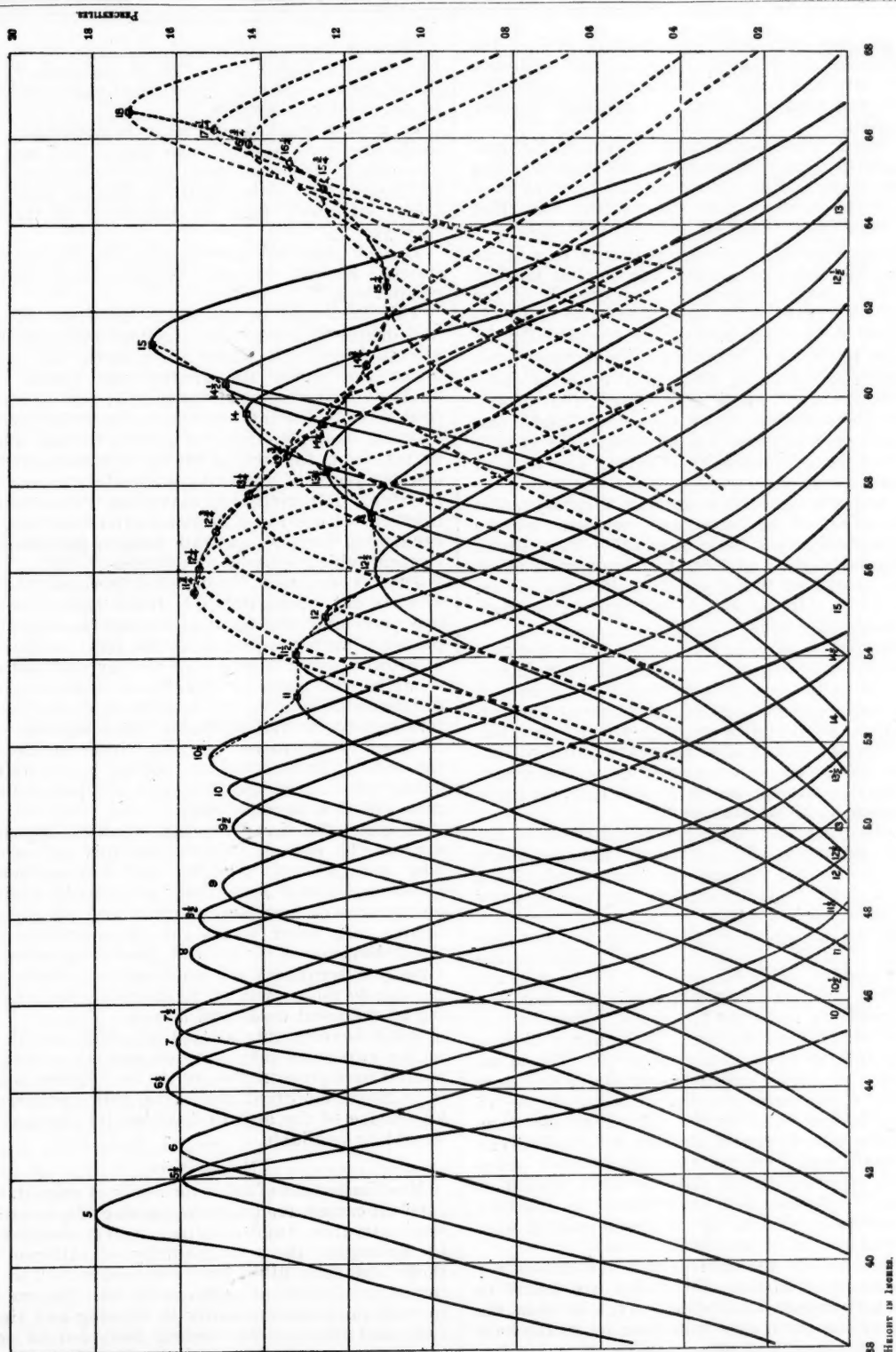


FIGURE IV..

Graph Illustrating Proportionate Distribution in Each Age Group According to Height in Inches. Continuous Line: Commonwealth Cadets (Boys). Interrupted Line: Sydney Girls.

The relative body and limb lengths and of the proportionate development of chest and abdomen *et cetera* are deserving of investigation, especially in the newer study of growth in relation to endocrine action.

The recent observer defines microsomatic and macrosomatic types, according as the limbs are less well developed, and alleges associated types of mental development, the limbs constituting our chief contact and employment of our surroundings.

Speculative as this may be, observation of a series of delinquent boys of similar age showed marked variation in body proportions and growth of the external sex organs. The achondroplastic, with his full-sized body, but diminutive limbs, especially the thigh and upper arm, is perhaps the grossest type.

The most obvious and differential effect of endocrine secretions on growth is, of course, that of sex. The usual description, based on actual height and weight of boys and girls, is misleading. The growth force must be estimated by studying the rate of change.

Two methods are here at our disposal. The simpler is that of the percentage increment for the yearly or half-yearly time interval. This shows that in both height and weight girls grow at much the same rate at six to eight and a half years. From nine years to thirteen and a half, girls grow definitely faster than boys.

The relative behaviour of the two sexes shows a complete reversal during the thirteenth year, *id est*, corresponding to the onset of puberty. The rate of growth reaches its maximum in girls about the thirteenth year, to diminish rapidly during the thirteenth, fourteenth and fifteenth years. In boys, exactly the reverse occurs, the rate of growth in weight rising rapidly during the thirteenth year, to reach a maximum at about sixteen.

These findings are directly contradictory of the constant assertions that girls at the secondary school age are at a rapidly growing period. As a matter of fact, they are ceasing rapidly to grow during early adolescence.

The second method is more complicated, but confirms this finding. It further has, I believe, the merit of novelty. This consists of a study in graph form of the proportionate distribution in each age group according to height in inches. Quetelet had long ago shown that the curve of human variation typically follows the binomial theorem. The maximum point of each curve or the mode is the most frequently found measurement, while the degree of variation is indicated by the spread at the base. Boys of the central age of thirteen, *id est*, between twelve years and nine months and thirteen years and three months, have a mode at 56, a spread of 15 inches, 49-65 (negative skewness). At fourteen and a half years central age the mode is 60½, with a spread of over 16 inches, 52-69.

If we record on the same graph the curves for each successive half-year, the modes are found to vary in a curiously interesting way. In boys the line connecting the modes runs parallel to the base till thirteen years, with some skewing of curve forward, *id est*, negative, and then descends towards it, being lowest about fifteen to fifteen and a quarter,

with some increase of spread, and then rising again to assume a higher level still at eighteen, with reduced spread and some skewing of curve backward, *id est*, positive skewness.

In girls a marked difference is noticeable. The mode line runs level till ten and a half and then descends to the lowest point about twelve and a half to thirteen and rising again at fifteen, which contrasts strikingly with the behaviour of the mode in boys.

In each graph the mass figures for Commonwealth cadets, figured by Mr. Knibbs, are used for comparison.

This behaviour of the mode—skewness of curve and degree of spread—is excellent evidence of the growth force. The faster the growth, the less frequent the mode, the greater the spread. The analogy of a race when the pace is put on and the field spreads, leaving fewer in the ruck, is a striking sporting example. Rate of growth is thus fixed at its maximum for boys at fifteen to fifteen and three-quarter years of age, with a steady increase after thirteen. For girls, the maximum rate occurs at thirteen, with a rapid decrease after that age, thus confirming in more accurate fashion percentage increment which is based on averages.

Just as in a race, as the pace increases the field spreads out, proportionately fewer travel the average pace and the greatest spread occurs at the period of fastest pace, so at the most active stage of growth, under the whip of the thyroid-testicular stimulus, the mode is lowest and covers a greater difference of heights, to close up again as the race terminates. At the beginning, the longer spread is in front as the faster get away from the field; at the end of the race the tail will be longer as those ahead are slowing up. Negative and positive skewness will thus be made equal.

In girls, the thyreo-ovarian stimulus appears to depress the rate of growth and this act explains why the girl who is taller and heavier between eleven and a half and fifteen, ends up in adult life on the average four inches shorter and many pounds lighter. In other words this diametrically opposite behaviour of the rate of growth at puberty is strictly a secondary sex phenomenon, exactly comparable to the growth of the beard or the lengthening of the vocal cords and larynx.

What bearing this altered physical growth rate in the two sexes may have on mental growth and mental over-pressure has yet to be followed up, but it is most important that a reliable and accurate knowledge of the growth force on its physical side should be available.

Malnutrition.

Most important of all is the study of malnutrition. Of all causes, the most obvious one of quantitative semi-starvation (underfeeding) is very rarely found in Australia; the vast majority of children have their stomachs filled, but with what? The first important feature in unsuitable food. Modern commercial progress, especially in canning and tinning food and urban overcrowding have led in recent years to a remarkable sophistication of our dietary. The fresh foods are steadily occupying a less adequate position. Milk, fresh meat, fresh vegetables,

butter are poorly supplied, especially to children, who receive the same diet as the adults, namely, stews, dripping, tea, bread and jam, salted meat and fish. Yet in the growing period the human organism needs vitamins, which stimulate growth and are useful to the adult, but essential to the child.

The utilization of foods, however, presupposes first of all a healthy digestive tract, yet we know, as McCarrison points out, that an ill-balanced ration means indigestion and the failure to digest and absorb utilizable food.

Secondly, it presumes the nutritive stimulus, partly supplied by the food itself in the case of vitamins and partly created in the organism by exercise, rest and sleep in the fresh air.

In the third place, it presumes the power of chemical disposal in the body itself, partly supplied by vitamins and endocrine secretion; but as recently shown a substitute is at hand in the violet rays of sunshine (photo-syntheses).

Only certain children of those living under similar conditions of diet, housing *et cetera* nevertheless are examples of malnutrition. Many cases occur in rich as well as poor, nor is it all due to ignorance as to suitable diet.

Inherited family tendencies, the nervous temperament, antedated fertilization, antenatal life deserve attention. Prematurity may leave persistent effects. Soon after the neonatal period comes congenital syphilis.

In school life, without a blood test, most cases of this are unsuspected, yet malnutrition, stunting and backwardness may still represent the trail of the spirochæte.

From the suckling period and early infancy dates what is probably the most important background of all—rickets. This is very common in mild degrees; it affects 20% or more of city children and is the cause of a large proportion of school cases of malnutrition. The tendency of this disease is to improve, provided the correct diet is available to make up for the losses by early artificial feeding with patent foods.

Fresh milk, fresh fruit and fresh vegetables are our sheet anchors. Exercise and sunshine help.

In the early two and three years of life we find the maximum susceptibility and mortality of most of our common infectious diseases—diphtheria, scarlet fever, measles, whooping cough *et cetera*—which often leave malnutrition as a sequel.

At the school age infectious disease still operates, but early heart disease is not rare. Tuberculosis, on the other hand, is quite uncommon.

At the school age the common physical defects of vision and post-nasal growth may influence nutrition and often do so by an interaction with educational pressure.

The headaches of the one and the disturbed sleep of the other tend to produce one of two results. Either the child, in its efforts to keep its head above water, retains in somewhat unstable fashion its class level at the expense of bodily nutrition or it gives up the struggle and becomes retarded in school, but is physically unimpeded—the typical, dull, heavy type.

The removal of adenoids has in open-air residential schools often proved a necessary preliminary to progress in weight.

The effect of dental caries is serious, but not invariable; oral sepsis has the more potent effect. Dental abscess and fistulæ are found by our dentists in not less than 10% and even up to 30% of school children. The suffering, the masticatory failure and the swallowing of poisonous products connoted by this finding all combine to lay stress on the importance of acute peri-odontal infection, which thus corresponds in its effects to the chronic infection "pyorrhœa" so potent in adults.

Dental disease is itself after all largely an evidence of failure in hygienic habits, deficiency in early feeding and unsuitable present diet, which again are the real dominant causes of malnutrition.

Overcrowding in the home, especially in the ill-ventilated bedroom, is often responsible for anæmia, the twin brother of malnutrition.

After reviewing all these and eliminating the less important, it will be seen that faulty hygiene, especially improper feeding habits and lack of a truly adequate and balanced diet scale, is the final cause of malnutrition in school life, aided and abetted, no doubt, by all these antecedent association and present defects.

An analysis of ordinary diets shows that children eat what their parents eat, that fresh foods are rarities, that parents have no conception of the essential value of milk as a food in the growing period or that even at present high prices milk is cheaper than meat and is indeed the one food for children which cannot be effectively replaced. Supplementing as it does so well the common deficiencies in diet of lime and phosphorus for bony growth, the special quality of its proteins and the peculiar vitamin associations of its fat, make milk the ideal protective food essential to a properly balanced dietary in childhood.

This, then, is the *raison d'être* of the great and important movement in our infant departments, introduced in 1922 by Miss Simpson on the lines of the Infant Health Organization of America.

Practically every subject of the syllabus employs health material—reading, writing, arithmetic, drawing, dramatization, stories all relate to and correlate with health.

The parents have been interested and have already furnished funds for weighing machines costing £6 10s. each in fifty schools and it is expected over fifty more will come in this year. A happy cooperation exists with the Country Milk Suppliers' Association, who, as part of their "More Milk Campaign," have printed weight tags and health cards on which are printed the rules of the health game.

In the headquarters school free milk is provided for twenty children, but it is hoped soon to have bottles of one hundred and eighty to two hundred and forty cubic centimetres (six to eight ounces), equalling a pennyworth of milk, supplied, to be drunk with straws at the child's lunch.

The basis of the work is the strict quantitative periodic estimate of weight. Height is taken every

six months and weight every month. These are recorded, together with the average weight per height on the class weight chart and on the tag the child takes home.

The play way is the chosen path; the children take wonderfully to the work and indeed exert a valuable pressure on the homes. Windows are opened up at night, showers operate daily, teeth are regularly brushed and milk increasingly consumed.

The movement, too, is leavening the upper departments of the school and producing an active and healthier interest in hygiene teaching.

Epidemiology.

A beginning is being made in the study of the periodic incidence of the common infectious diseases of school life.

Notification, the method of most health departments, is in Australia, as elsewhere, confined to the more virulent and directly fatal diseases, passing by the commoner diseases of children, with the exception of diphtheria and scarlet fever.

While the statistician may give the number of actual deaths, health departments can give us no information concerning the incidence of these common infectious diseases, such as measles, whooping cough, mumps *et cetera*. Yet the invalidity they create is considerable and the long range effects by no means to be despised while measles and whooping cough in children under five are responsible for more deaths than diphtheria and scarlet fever.

The effect on school attendance is a serious one. The isolation of the sick and in certain diseases the exclusion also of home contacts means that as a rule one-fifth of all school children are away for one month each year or an average loss for every child during the school period of over six weeks.

Thanks to the foresight of my predecessor, Dr. C. Savill Willis, an annual return of infectious disease has been made since 1913. In 1922 a quarterly return was substituted. We are now able to give the State school experience of these various diseases for the past nine years. The graph demonstrates a marked tendency to periodic reappearance in certain diseases.

The cycle of measles appears to be from two to three years. Mumps returns every six to seven years. On the other hand, diphtheria has a regular seasonal incidence, but a steady yearly increase. Typhoid has a similar seasonal incidence, but is decreasing year by year.

The study of these cycles may be helpful in giving us further insight into the causes of epidemic prevalence. It provides us with a fairer basis for testing the result of preventive efforts. A reduction in the number of cases may merely be the trough, a rise the crest of a cyclical wave and imply neither praise for health work in regard to the former nor depreciation of it in regard to the latter.

On the other hand, reduction during the normal crest or peak period is a favourable finding. It

may allow us to foresee an epidemic in any given year and so permit of concentration of effort against that special disease menace.

Mumps was predicted for 1922, but our ignorance of preventive methods for mumps rendered this valueless.

Still we may reasonably hope that a further study of the life history of these natural phenomena may give us further and more valuable clues to their creation, their characteristics and their control.

Diphtheria remains still unconquered, in spite of modern advance of knowledge. While the use of antitoxin has given us control over the disease, so that early treatment insures recovery, the attack rate is unaffected, if not increasing. Curative measures may thus be valueless in prevention. The Schick method of first defining those who are susceptible and then protecting them by an injection of the toxin-antitoxin mixture seems promising and is about to be tried in New South Wales. One fact already has been proved by this test, namely, that, just as in measles and whooping cough, the maximum liability to contract (and to succumb to) diphtheria is in the pre-school ages, about the third year. This most important finding, demonstrating as it does that the focus of diphtheria epidemics is in children who are not yet attending school, clinches the argument against school closure, which is still so popular and so futile. Nowadays we are confining this action to very remote rural schools, where the school may be the only meeting place, and to the special case of a pandemic like influenza, where every form of human assemblage is forbidden. In town schools closure is worse than useless, its only result being to crowd the moving picture shows.

The Schick test, however, demands a high degree of technical skill in the preparation of the material used and we are here totally dependent on the laboratory. Till its efficacy is tested we are endeavouring to carry out vigorous swabbing methods, following up infected children to their homes and dealing with all home contacts. This transference of the central point of the attack to the home is essential to insure success. In Broken Hill it has now for three years in succession prevented the rush of infections in June and July which had been typically experienced there for many years and still occurs in the State as a whole.

Dental Disease.

Judged by its universality, its destructive effects and the wide-spread degree of disability it leads to, dental disease may be denoted as the great disease of civilized communities. While Nature intended every human being to live and diet with a complete permanent set of teeth and our ancestors enjoyed that privilege, we, though physically better built and possessing as a mass advantages then possessed by the few, nevertheless can rarely claim such a priceless feature as a complete set, even after strenuous and painful and expensive dental attention.

Our knowledge of underlying causes must be confessed to be incomplete. While rightly our first

concentration is on outward cleanliness, nutritional studies are only just beginning to drive home the need for care of the permanent teeth in their formative period, even before they are in sight. We might almost say that, once they are erupted, it is too late. Nothing is more characteristic of children born overseas than the malformed, so-called hypoplastic teeth, due to that nutritional disturbance called rickets operating on the portions of the permanent teeth formed within the jaw at six to eighteen months of age. While 25% and more of London children showed this, it is a finding of the greatest rarity in Australian children.

Diet at later ages again plays a predominating part. The essential elements of bone and tooth formation, calcium and phosphorus, and the necessary vitamin stimulus may both be inadequate for the requirements of the concrete laying cells—the osteoblasts or odontoblasts—and so we find the enamel of limited depth and even deficient along certain fissures—a most serious weakening of the chief barrier against infection.

Diet is again a dominant factor in a physical sense. Modern, sophisticated, pappy foods do not permit the jaw work that builds well-spaced jaws and fully formed roots. Use means growth and it is interesting to note that the stress of irregularities is chiefly obvious in the upper jaw, for, while the lower jaw is very early and usually fully formed, the upper jaw is completed later and its design decided by the opposing forces of the lower jaw and the rise of the nose in breathing. Hence ill-formed palates are the result of this lack of stimulus, most prone to occur in the rachitic bone, combined with the nasal destruction of adenoids and aided by imperfect mastication of soft food. Again, the very firmness which demands vigorous chewing, both directly and indirectly through increased saliva, leaves the teeth clean.

At the present moment the dental surgeon has to be relied on to keep the teeth intact. His maximum value as a preventer of mischief is at the very years of school entrance; the work then is least. This transitional period, during which the milk teeth must go and most of the permanent appear, is the critical period. A child of eight may be regarded as requiring just about three times more dental work than a child of thirteen years. Even in the eight-year-old child sepsis is so frequent that abscesses or fistulæ exist in 10% to 30%.

The concentration on the six-, seven- and eight-year-old children is now our plan in rural districts. Over nine years we only deal with those children notified by the medical officer. These include children who show some definite effects in the way of ill-health, such as malnutrition or anæmia, children in whom sepsis or toothache demand emergency attention and children for whom preliminary dental treatment is advisable, either as actual treatment in dealing with enlarged tonsils or as preliminary treatment to permit of a clean operation, as in adenoids. The method is economical, for more children can be treated in the time and less caries is likely to occur later.

The principle of dental and medical cooperation is about to be given effect to at the Children's Hospital, where two part-time dentists are about to be appointed to render the mouth relatively aseptic by the removal of all caries and oral sepsis before operation on the nose and throat. All children with adenoids *et cetera* operated on will, instead of being sent home at once, be taken indoors and spend a couple of days recovering in a special ward. At least two thousand children should be handled yearly.

The New Zealand experiment, with school dental nurses carrying out simple operative work, will be watched with the greatest interest, but under the present *Dental Act* in New South Wales it is doubtful whether even school dental nurses or rather hygienists carrying out a regular periodic inspection and performing a complete toilette of the mouth will be permitted.

Conclusion.

In conclusion, progress in health (and, after all, health means progress) appears dependent on our gaining control of the growth period of the human organism. The two greatest menaces, infectious disease and nutritional influences and disturbances, are eminently factors capable of human influence and the means are at our command for their conquest. First we must have faith in the dictum of Pasteur, that the power is within our grasp, not only to free air, water and milk, but also the human being of every form of infection and confidence in the creation of a health conscience by education. After all, what is health but the result of ideas and ideals, habits and customs, the establishment of which for every generation is essentially the function of the educationist?

Secondly, we must have hope in the investigator, with the expectant conviction that science will solve the problems which still oppress us, make clear the path we at present see but darkly, give us a full conception of the wonderful resistant powers of the human body, of how to develop and reinforce these powers. We must have hope in the legislator, for public health is purchasable and health insurance the cheapest, most economical and productive of all forms of State expenditure. We look for a statesman who will realize the obvious fact that tens of thousands spent in prevention, is a better proposition than hundreds of thousands spent in curative efforts, that health department is like our fire departments, which cost a great deal to keep up—money cheerfully paid for the fires that do not occur. Democracy certainly won the war; it has yet to win the peace campaign of health, strength and happiness.

Our greatest hope is in the child and its immediate horizon, the home, and shall I say also its mother? Health, like charity, begins at home. The right of every child, indeed, of everyone, to fresh air, good food, regular open-air exercise, decent recreation and thorough sleep, adequate weather protection, the means for habitual cleanliness and freedom from exposure to infection, *id est*, a reasonable existence for twenty-four hours a day, is gradu-

ally filtering into the national consciousness. Above all, it is the child we look to as the saviour of society, the creator of health, for it is far easier to form than to reform.

«Finally, we all need that love, that enthusiasm for humanity which raised the child to a pinnacle of importance previously unknown and condemned every form of indifference to mankind and to human suffering. Our motives as health workers must be unquestioned and unquestionable if we are to demand from parent or practitioner or parliamentarian that cooperative idealism which clears away all obstructions which human selfishness and greed, class-consciousness and hatred, industrial misunderstanding and unrest, professional conservatism and jealousy, party blindness and strife, raise as barriers against us. Health knows no boundaries of class or creed or country and firm-based on the faith of scientific truth, the hope of human educability and adaptation and the enthusiasm for humanity rises unconquerable to the salvation of the nations of the earth.

Reports of Cases.

ARTIFICIAL CYANOSIS IN AN HYSTERICAL PATIENT.

By O. W. RAWSON, M.B., B.S. (MELB.),

Resident Medical Officer, Melbourne Hospital.

THE following is a report of an unusual condition in a patient who has been treated at the Melbourne Hospital for some time:

Miss F., *atatis* 36 years, had rheumatic fever when seven years old. She was at the Greenvale Sanatorium and also at the Austin Hospital when twenty years of age, suffering with pulmonary tuberculosis, her heart being apparently normal at this time.

In 1912 she was admitted to the Melbourne Hospital, suffering from "angina pectoris and hysterical fits."

In 1915 she was an in-patient three times with the same complaint and one report states that the patient was "considered hysterical and in a large degree her pain is pseudo-anginal." The heart again was considered to be normal.

In 1921-1922 she was admitted several times and during these years was noted to be cyanosed.

In the latter part of 1922 she was deeply cyanosed, very short of breath and complained of continuous pain down her left arm.

Early in 1923 she came under my observation. Her cyanosis was confined to her lips, cheeks, ears and nose; the fingers were not cyanosed. Her respirations were between 40 and 60, except when not being watched; on one occasion she was noticed to be breathing at about a normal rate and a few minutes later at somewhere between 50 and 60, no exertion being performed between the observations.

At this time it was noticed that her cyanosis had rather an abrupt ending on the mucous membrane of her lower lip. On this account a nurse washed her face, with the complete disappearance of the cyanosis. The patient left hospital shortly afterwards with no trace of the blueness which had been present for two years.

What the material used to produce this artificial cyanosis was, I do not know, but the imitation was nearly perfect. Some of my colleagues on the resident medical staff, who

had seen her previously, did not believe it until they had seen her with a perfectly healthy-coloured face.

I could not determine her reasons for this deception. On several occasions she was noticed to be of an hysterical nature, even her anginal attacks being doubted, and she certainly was one of that ever-growing band who are happiest when occupying a hospital bed.

Reviews.

POPULAR INSTRUCTION ON PULMONARY TUBERCULOSIS.

In the book entitled "Lessons on Tuberculosis and Consumption" the author, Dr. C. E. Atkinson, sets himself a threefold task.¹ The book is professedly written for the household and the laity in the hope of teaching them how to prevent tuberculosis, how to recognize its first symptoms and how to win back health. The advice given under these different heads shows that the author is a master of his subject and thoroughly conversant with present-day teaching. He holds no brief for any particular theory or method of treatment, but deals with each topic in a clear and fair-minded way.

For a medical practitioner who has full control of his patient, this book could be of great assistance. By putting it in his patients' hands and ordering specific sections to be studied from time to time, he can gradually train his patient to an intelligent appreciation of the reasons for the regime laid down in that particular case and so secure willing cooperation.

While at first sight the book seems lengthy for the ordinary layman to read, its division into lessons on particular topics makes it possible to learn one lesson at a time; the print is large and clear and the plain headings of the different topics make it easy for a patient to confine his attention for the time to the aspect of the subject his doctor wishes to emphasize.

The same clarity of thought and good judgement marks the treatment of the sections dealing with the prevention of the disease. If the truths made plain here could be grasped by the general public, nothing but good would result. But when we come to the chapter dealing with the recognition of tuberculosis, some qualification of this praise seems necessary. The suspicious symptoms and signs could hardly be put better; the writer states at the outset of the chapter that his object is to put patients on their guard and to induce them to consult a medical practitioner. He rightly urges practitioners to be frank with their patients and patients to cooperate with their doctor or change to one with whom cooperation is possible. But all such good advice is nullified by the following statement in the middle of the chapter: "Yet certain circumstances may force upon you the necessity of diagnosing your own case. If this becomes necessary, with reasonable care in estimating the pros and cons you will very likely be able to decide the matter with sufficient accuracy to justify you, if the verdict is in favour of tuberculosis, in at once instituting measures to eradicate the disease." Apart from the fact that it is impossible to imagine the circumstances which can compel anyone to diagnose their own case, no advice could be more dangerous than to suggest to any layman that he is capable under any circumstances of becoming his own diagnostician and therapist. Nor does it seem wise to burden this chapter with illustrative cases, as is done. The householder is not in a position to weigh such evidence. If these summaries of cases were removed from a subsequent edition and the author followed up his account of suspicious signs and symptoms by urging readers without exception to consult a medical practitioner, if they are at all suspicious about their condition, he would remove a serious blot from an otherwise excellent production.

¹ "Lessons on Tuberculosis and Consumption for the Household," by Charles E. Atkinson, M.D.: 1922. New York and London: Funk & Wagnalls Company; Post 8vo., pp. 470, with twenty-one illustrations. Price: \$2.50 net.

The Medical Journal of Australia

SATURDAY, MARCH 10, 1923.

The Maternity Bonus.

THE new Federal Government has many things to consider before its full programme is presented to Parliament. With economy and efficient service as its objectives, it has by no means an easy task ahead. In July of last year the Federal Committee of the British Medical Association in Australia recommended to the Federal Government a revision of the maternity bonus system. The present Prime Minister, then the Federal Treasurer, had expressed the opinion that this scheme was largely a vote-catching device and that a part of the money paid as bonus was mis-spent. It may therefore be anticipated that this matter will be the subject of early attention and revision.

The Federal Committee advocated the utilization of the money earmarked for the maternity bonus for the purpose of establishing more maternity hospitals, ante-natal clinics and infant welfare centres, for the provision of more efficient training in midwifery of nurses and students, for the provision of help for mothers and expectant mothers in necessitous circumstances and for "such other measures as are advised from time to time by medical experience." It will be noted that these proposals include the retention of financial aid for mothers and expectant mothers in necessitous circumstances.

In order that these proposals may be translated into action, it will be necessary to define as exactly as possible the reasons why the maternity bonus has failed to reduce those dangerous conditions that produce suffering and death of women in childbirth and those processes that maintain a high death rate of young infants. The facts have been recited on many occasions in many ways, but the public does not appear to have grasped the seriousness of the position. In the year 1921 136,198 babies were born in the Commonwealth. In 1920 the number was 218 greater. In the twelve months ended June 30, 1921,

bonuses were paid to 140,152 women. In addition to these women, there were 622 who made claims for bonuses which were subsequently refused or withdrawn. This number may be reduced to 440 by the exclusion of aboriginal natives and Asiatics and of women whose babies were born outside Australia and also of those who were delivered of fetuses not yet of a viable age. From these figures it may be assumed that the number of still-born infants in the year 1921 was not less than 3,444 and was probably considerably more. In 1921 643 of 135,030 mothers whose pregnancies continued to full time, died of some puerperal infection or accident. That means that one woman out of every 210 failed to survive the lying-in period. These 643 women left 1,554 motherless children. This story is a sad one, but that of the babies is still worse. Of the 136,198 infants, 8,952 died within the first year of life. This means that 6.57% of the babies born gave up life's bitter struggle within twelve months. Over one-third of them died within a week of birth, while nearly one-half were dead before the first month was completed. If the assumption be permitted that the number of still-births was about 3,500, the wastage of infant life in 1921 would amount to 12,500 in round figures. This means a loss to Australia of 2.3% of the entire population. Not only is this loss intolerable, but it becomes even more serious when the birth rate is taken into consideration. New Zealand boasts of the lowest infantile mortality in the world, but its crude birth rate is 6.8% lower than that of the Commonwealth. In 1921 the crude birth rate in Australia was 24.95. In several countries it was over 40. Low birth rates mean that free use is made of anti-conceptional measures, which may be regarded as loss to the nation of useful lives. It also means a high rate of interference with pregnancy or, in other words, an increased destruction of infantile life. If the birth rate in Australia were increased by 5% and the infantile mortality remained unaltered, there would be a net gain to the Commonwealth of about twenty-five thousand citizens each year. It may therefore be claimed without fear of contradiction that the figures supplied by the Commonwealth Statistician indicate a dire tragedy both for the individual and for the whole community. Politicians talk glibly of "Australia's

best immigrant," but the complacency with which this suicidal waste of Nature's opportunity is accepted, is little less than condoning a crime.

It is impossible to deal in this place with the ascertained causes of puerperal morbidity and mortality and infantile mortality. Moreover, these subjects have been discussed in these pages on several occasions within recent times. Suffice it for the present to state that much suffering and death can be prevented by the proper care of women during pregnancy, by skilled attention during the birth and the puerperal period and by the well-planned control of the mother during the nursing period. Further gain must result from the study of the obscure causes of illness and death of unborn foetuses and young infants. Nearly three-quarters of a million pounds sterling is available for this campaign. The first necessity is the establishment of ante-natal clinics in all parts of the Commonwealth. The assistance of the Federal Government in enabling the State Governments to equip these clinics is essential. The clinics must be placed under the control of competent medical practitioners with experience in this form of preventive work. In order that the supply may equal the demand, it would be necessary to organize large clinics in connexion with the teaching hospitals and to make provision for repeated post-graduate courses in these clinics. In the next place, medical practitioners should be encouraged to extend this care to their private and lodge patients, especially in those districts far removed from the larger towns or cities.

The second requirement is the provision of an adequate number of maternity beds in hospitals or other institutions, so that institutional treatment may become available for every woman in labour. Simultaneously the instruction in obstetrics given to students must be reorganized and facilities must be created in order that every student may obtain sufficient practical instruction to render him a competent obstetrician. The training of obstetric nurses and of midwives must also be improved and an adequate system of supervision of the work of registered midwives introduced to safeguard the mothers of Australia.

The third chapter involves the utilization of every available agency to bring young mothers under the

care of medical practitioners and skilled nurses, who may induce them to nurse their babies at the breast for at least six months. It has been demonstrated that failure in this regard is nearly always the result of mismanagement or ignorance. With proper care the vast majority of mothers can suckle their babies for from six to nine months with great advantage to the nation. Premiums should be offered for mothers who obey Nature. The cost of establishing and maintaining infant welfare centres or "consultations" is not great, but the necessary money should be provided for this essential part of the scheme. There would still be some unexpended money for the financial assistance of the necessitous mothers and expectant mothers. If the Federal Government will make itself responsible for these activities, it may be anticipated that money would be forthcoming from other sources to subsidize research into the causes of infantile death and similar problems.

THE HOBART PUBLIC HOSPITAL.

For several years the Government of Tasmania has been satisfied to allow the Hobart Public Hospital to be in the hands of its *protégé*, who has had supreme administrative and professional control. It will be remembered that in 1917 the Government of Tasmania endeavoured to establish the principle that State-supported hospitals should be open to rich and poor alike and that no differentiation should be made in the manner of housing and treating patients within these institutions. The members of the honorary medical staffs of the Hobart and Launceston General Hospitals, relying on the policy adopted by the Australasian Medical Congress and subsequently confirmed by the Federal Committee, refused to be exploited by the Government and in consequence resigned their positions pending the reconstitution of the hospitals. The policy is logical and unambiguous. Patients treated at hospitals maintained by donations of the charitable and by Government subsidy should not be permitted to pay for maintenance and treatment and only those patients who cannot afford to pay for the necessary treatment, should be admitted to hospitals entirely dependent on State support. The demand was there-

fore made that the public hospitals should be regarded as charitable institutions for the care and treatment during illness of the necessitous poor, to whom the medical profession was prepared to give gratuitous attendance. The subsequent events, the passing of a foolish *Hospitals Act*, the engagement of a small salaried staff at the Hobart Public Hospital and the open feud between the medical profession and the Government, may be passed over for the moment. More recently a quarrel between the Surgeon Superintendent and the House Surgeon culminated in the dismissal of the latter. The Hospital Board was required to defend itself in an action for wrongful dismissal and was mulcted in damages. As a further result of this nauseating public incrimination, the Government appointed a Board to inquire into the administration, the management and the conduct of the Hobart Public Hospital, into the existing agreements of the members of the medical staff of the Hospital and into other matters appertaining to or connected with the functions of the Hospital as an institution established for the public welfare. The Board comprised three members—Mr. E. W. Turner, a police magistrate, acting as chairman, Dr. E. Sydney Morris, the Chief Medical Officer of Tasmania, and Mr. E. H. Kennedy. The Board entered upon its duties on January 17, 1923, completed its inquiry early in February and issued its report on February 21, 1923. The evidence given before the Board is relatively uninteresting. Few of the witnesses could be described as experts on hospital administration and their views, with one or two exceptions, may be regarded as immaterial. The evidence of patients as to the value of the treatment received is also of small importance. The members of the Board pointed out that favourable evidence could be discounted, because a patient cannot be a reliable judge concerning the correctness of the diagnosis. The witnesses who had complaints to make, likewise, failed to establish anything of a positive nature. Among the facts brought to light, mention may be made of two. The first concerns the relation of an operating surgeon to his colleagues. In the Hobart Public Hospital it has been the practice of the Surgeon Superintendent to require the Matron to administer the anæsthetic and the nurses to assist at operations. Victor Richard

Ratten claimed that he had greater reliance in the ability of the Matron as an anæsthetist and of the nurses as assistants than in the ability of registered medical practitioners in these rôles. That this attitude is indefensible will be the opinion of every medical practitioner recognized in the British Empire. In emergency a nurse may be required to give an anæsthetic, but when a responsible and properly trained registered medical practitioner is available, no surgeon is justified in adopting this expedient. It is probable that the "Warning Notice" of the General Medical Council would apply in the instance of the habitual employment of a nurse as an anæsthetist. The Board reports that they can see no objection to the continuance of the employment of the present Matron in the capacity of anæsthetist, provided that the supervision of the nursing staff does not suffer. In regard to the substitution of nurses for medical practitioners as assistants to the surgeon performing major operations, the Board recommends that it is necessary for a qualified medical practitioner to be present at these operations.

The second matter involves the question of the interpretation of the term consultation. The agreement with the Surgeon Superintendent gave him the right to engage in consultative practice. Victor Richard Ratten interpreted this in a loose manner. When a patient wished to consult him, the patient was sent to either Dr. Crowther, a practitioner who holds what appears to be a sleeping partner position on the staff, or Dr. Macgowan. The patient would be returned to Ratten with a letter, but in many instances no examination was carried out by Dr. Crowther or Dr. Macgowan. It was claimed that the consultation consisted in a subsequent discussion "of the case." It appears, however, that the Board was aware of the nature of this farcical procedure and that the renewal of the agreement was made without any alteration of the terms, notwithstanding the fact that a definition of the term had been suggested. The Board recommends that in any future agreement, the Surgeon Superintendent should not be allowed the right of any private practice, or if this ideal be unattainable, that the rights be clearly defined.

The Board has considered the various methods

of staffing the Hospital. Objection is made to the so-called open system on the grounds that, by allowing any medical practitioner to send his patients in to the Hospital and to treat them there, this would have the effect of handing over the professional work to persons over whom the public would have no control. It would also result in confusion within the Hospital. The honorary system without a responsible paid resident staff is also refused. It is claimed that the attendance of honorary medical officers would be irregular, owing to the exigencies of their private practices, which would take first place in their daily work. It is a little difficult to know what the Board means by "responsible paid resident staff." Since the Board favours a permanent paid staff with the addition of honorary assistants, it would seem that the responsibility demanded is both administrative and professional. The main disadvantage to the employment of a medical superintendent who takes professional precedence over the visiting medical officers, is that one or two men acquire nearly all the experience and the assistants remain in a rut. It is in the interest of the community that as many practitioners as is practicable should gain valuable experience at the hospitals. The Board advises that four or five practitioners should be elected to positions as honorary assistant medical officers in addition to specialists and that the honorary officers should be appointed for a term of three years. After a term of office, these practitioners should be ineligible for re-appointment for a further period of three years. The Board further recommends that there should be a State pathologist and bacteriologist, whose services would be available to all hospitals and medical practitioners in the State. It is also held that the appointment of an expert radiologist would be a distinct gain.

These recommendations carry with them one advantage of considerable moment. They open the door of the hospital at Hobart to the medical profession and show the way for an adjustment of some of the disagreements of the past. The members of the Tasmanian Branch of the British Medical Association are wise in ignoring the ethical aspect of this dispute. As members of a great profession they are concerned with the welfare of

patients and are anxious to give their services to those who are unable to secure them outside for payment. It is, however, difficult to accept a solution of the problem, if this involves the relinquishing of a logical principle. As honorary medical officers, even if their positions are subordinated to those who hold the salaried offices, they cannot agree to give gratuitous service to the well-to-do. The Board suggests that some modifications of the rules may be necessary to facilitate the admission of general practitioners as honorary medical officers to the staff. It is to be hoped that some acceptable formula will be found in this way to overcome the difficulties. The medical profession must not be expected to make all the concessions.

Current Comment.

RENAL FUNCTION AND STRUCTURE.

THE failure that has attended all attempts to correlate the degree of renal disturbance with the extent of damage to renal tissue, must be regarded as an indication of the inability of the tests of renal function in use at the present time to reflect in quantitative terms what they are supposed to measure. Nature has adopted the satisfactory expedient of providing an excess of tissue in every vital organ, so that the requirements of the organism may be covered without any organ being called upon to put out its maximum amount of energy. The margin of safety is usually a wide one. The ordinary individual can afford to impose a great strain on any of his functions without a risk of a breakdown. Life can be sustained under ordinary conditions without difficulty when a large part of the thyroid gland, of the pancreas, of the blood, of the hæmatopoietic organs and of other important tissues has been lost. One kidney may be missing without immediate danger to the person. It is in consequence impossible to measure the amount of normal tissue of any particular kind from the records of the functions of that tissue under ordinary conditions. That Nature is not unduly extravagant in providing this excess of functioning tissue is manifested by the frequency with which this reserve is called up in many pathological conditions. Moreover, it is evident that the proper physiological exercise of the body tissues is dependent on a rhythmical period of rest. This is rendered possible only by the presence of more functional tissue than is required at any one time to cover the needs of life. If a voluntary muscle is kept in maximal activity for a considerable period of time, the energy curve tends to be lowered until the contractions become feeble and valueless. Much of the modern work in connexion with diabetes has been evolved

in an attempt to reconcile the condition of the patient with that of a dog or other animal which has been deprived artificially of so large a quantity of its pancreas that the requirements of the body in regard to the metabolism of sugar are no longer met. In the future clinicians will demand evidence to reveal the extent of the reserve of any essential tissue, so that the significance of a pathological process can be measured with accuracy. Bright endeavoured at the time when he described the pathology and clinical manifestations of the acute and chronic forms of parenchymatous nephritis, to measure the amount of affected renal tissue by physical and chemical means. His attempts, unfortunately, were unsuccessful, as have been those of the investigators who have followed him. At present the surgeon about to remove a kidney is satisfied if he can be sure that the organ he proposes to leave within the body of his patient is performing its functions. The tests he employs merely tells him if the "other" kidney is secreting urine at a sufficient rate to support life. He learns nothing of the limit of safety of the patient deprived of one kidney, nor is there any means for ascertaining the proportion of functioning tubules and glomeruli of the diseased organ.

Dr. T. Addis is convinced that it is not impossible to measure the amount of functioning renal tissue by indirect means.¹ He has arrived at the conclusion that the reason for the failure is to a large extent to be sought in the fact that none of the functional tests aims at a measurement of the maximum output of the renal tissue. After careful consideration of the requirements of a workable test, he published in 1917 some details of his urea ratio test. He has postulated two essentials. The first is that the kidney shall be required to excrete urea at its greatest rate. The second is that the test must be applied in the absence of specific renal stimulants and depressants. In order to give the kidney as much work as it is capable of performing, he requires the patient to drink about a litre of water containing up to thirty grammes of urea. The quantity of urea administered is determined by the level of the blood urea concentration. If the blood contains sixty milligrammes of urea to each hundred cubic centimetres, no urea need be given. On the other hand, if the blood urea concentration is between fifteen and twenty-five milligrammes in one hundred cubic centimetres, thirty grammes of urea are required. The test is carried out in the morning during fasting, so as to obviate the interference of stimulating or depressing substances. Great care is necessary in the collection of the urine at stated intervals and in the taking of the blood samples. Given accuracy in this respect and constancy in the amount of secreting tissue in the kidney, he claims that the weight of urea contained in the urine excreted in one hour divided by the weight of urea contained in one hundred cubic centimetres of blood may be taken as an approximate measurement of secreting tissue of the kidney.

The experimental evidence in support of this contention seems to be good. The author, however, is conscious that his formula holds good only under certain favourable conditions and must not be regarded as a definite law. At times the amount of secreting renal tissue is not constant, but varies. In such circumstances the ratio between the weight of the urea excreted in the urine in one hour to the weight of urea contained in one hundred cubic centimetres of blood was found to be directly proportional to the amount of secreting tissue in the kidney. Dr. Addis has studied the variability of the ratio in one individual at different times, in order that its significance can be ascertained. It is not improbable that there is a certain relationship between body weight and renal weight, but this relation is certainly not the most important factor. It has further been shown that the weight of the kidney varies to some extent with the surface area of the body. Be this as it may, it would seem that ratios of 50.4 to 40 usually indicate a normal amount of healthy renal tissue, that ratios varying between 39.8 and 34.5 may be associated with a doubtful amount of normally secreting renal tissue and that ratios of 33.9 or less indicate an abnormally small amount of active renal tissue. It remains to be seen whether these measurements actually tally with histological findings. Dr. Addis claims that they give valuable information in the diagnosis, prognosis and treatment of Bright's disease.

DIMOL.

FROM time to time a new proprietary preparation is introduced with a great flourish of trumpets and vaunted as an intestinal antiseptic. The life of these remedies is usually short. "Dimol" has now been in the hands of the medical profession for a considerable time and although independent evidence of its antiseptic action within the digestive tract is meagre, it certainly merits careful consideration in view of the clinical experience of competent observers. Dr. A. N. M. Davidson has expressed the opinion that the results he has obtained with "Dimol" in summer diarrhoea of infants justify further investigation.¹ He has given it to twenty-five infants. Two of the babies died. Both were suffering from very severe forms of gastro-enteritis and both vomited the medicament. It is, consequently, a reasonable attitude to exclude these two and to present the series as one of twenty-three patients without a death. On the other hand, it must be admitted that none of these twenty-three infants was very acutely ill. Dr. Davidson has not adopted the essential expedient in endeavouring to estimate the clinical value of a new drug, namely, the comparison of patients treated with it with patients treated without special medication. No ill-effects were noted. In regard to the bactericidal action, it is significant that *Bacilli coli communis* were grown from the faeces without difficulty after full doses had been administered.

¹ *Archives of Internal Medicine*, September 15, 1922.

¹ *The Lancet*, November 25, 1922.

Abstracts from Current Medical Literature.

MORPHOLOGY.

The Teres Minor Muscle.

DAVID M. GREIG (*Edinburgh Medical Journal*, January, 1923) contributes an article on the importance and function of the *teres minor* muscle and reviews the literature on the subject. Phylogenetically this muscle is inseparable from the deltoid. From the morphological evidence its function appears to be that of a fixation muscle, to keep the head and the humerus in the glenoid cavity. In pronograde animals the long axis of the humerus and scapula so corresponds that gravity, that is, the weight of the body, will materially assist in maintaining the articular surfaces in approximation, so that the use of the *teres minor* becomes of less importance and in these animals it is not well developed. In orthograde animals the fore limb is prehensile and the wide range of movement may even include circumduction; the axes of the bones of the fore limbs are practically at right angles. The action of gravity tends to draw the surfaces apart and the correct relation between the bones is maintained by muscular action. In these animals the *teres major* is well developed. The ganglion on the nerve to the *teres major* is merely a pseudo-ganglion. In common with the pseudo-ganglia on the posterior interosseous and anterior tibial nerves it is a vestigial structure. In any of these situations the pseudo-ganglia in the human subject are the abortive remnants of a suppressed cutaneous distribution and when this is present the ganglion is not found. The author does not agree with the usual teaching that this muscle is endowed with the function of external rotation of the humerus. He bases his conclusions on clinical observations of patients suffering from paralysis of the circumflex nerve, paralysis of the *teres minor* alone or of the *infraspinatus* with an intact *teres major*. The primary movement which the deltoid imparts to the humerus, is not abduction, but a drawing directly upwards of the humerus. Before abduction can be initiated the slipping up of the humeral head must be arrested. This is done to a large extent by the *teres minor* and other muscles may assist. The function of the muscle, therefore, is that of steadying the head of the humerus in the glenoid during contraction of the deltoid. Lateral rotation of the humerus is caused mainly by the *infraspinatus* muscle.

The Variations in the External Carotid Artery and the Common Facial Vein.

R. PROUST AND A. MAURER (*La Presse Médicale*, January 10, 1923), in writing of the treatment of cancer of the tongue, draw attention to some pecu-

liarities of the vascular supply which may be met with in the course of the operation on the glands of the neck. Usually the external carotid artery arises from the bifurcation of the common carotid between the upper cornu of the thyroid cartilage and the greater cornu of the hyoid. Less commonly the bifurcation may occur below the upper cornu of the thyroid cartilage or higher than the greater cornu of the hyoid, even at the level of the posterior belly of the digastric. These variations are accompanied by variations in the origin of the superior thyroid artery. In the usual and higher types of bifurcation the artery arises from the external carotid, but when the bifurcation is low, it arises either from the common carotid or from the bifurcation itself. The lingual artery is more or less constant in its origin from the external carotid. The venous distribution is very variable. The most important detail is the different arrangements of the common facial vein (thyreo-linguo-facial vein of the Farabœuf). Usually this is constituted by the union of the superior thyroid, superficial and deep lingual, the anterior facial and the pharyngeal veins, with also a branch from the posterior facial vein (the external carotid vein of Launay) and is usually stout and short. Normally it is placed at from one to two centimetres below and behind the greater cornu of the hyoid. It is about ten to fifteen millimetres in length. It may be long or very short, may be placed higher or lower and may be divided into two main trunks or less frequently the veins may separately join the internal jugular. A collateral venous channel uniting the common facial and the internal jugular at the point where it is crossed by the omohyoid muscle is sometimes present and may be so large that it may be taken for the internal jugular vein itself.

The Axis.

In *Journal des Sciences Médicales de Lille*, October 9, 1921, A. DELACQUE has studied the morphological development of the axis. He outlines the changes that take place, more especially in the direction of the axis of the odontoid process, and also changes in the shape of the whole vertebra from late fetal to adult life. The odontoid process is at first massive, pyramidal and bifid, but gradually elongates and narrows at its base to form a neck. In the adult the odontoid process bends backwards so as to deviate from 15° to 20° from the axis of the body, whereas in the fetus the two axes are in the same straight line. The inclination of the antero-posterior diameter superior articular facets is 20° to the horizontal and gradually diminishes until it corresponds to the horizontal plane. An inverse modification occurs in the inferior facets, which are at first disposed horizontally and lie at an angle of 45° to the horizon in the adult. The spinous process at first points backwards and upwards, but gradually comes to bend caudally, while the inferior borders of the neural laminae also bend in the

same direction. A similar caudal bending takes place in the transverse processes. The author introduces a numerical index to indicate the relatively greater increase in axial growth as compared with antero-posterior growth. The maximum antero-posterior diameter is divided by the vertical diameter and multiplied by one hundred. In the eight months' fetus the index is two hundred and in the adult it is one hundred and twenty-seven. Of other calculated measurements used as indicators, that of the ratio of the transverse diameter to the vertical follows a parallel course to the above. The usual ratio of the transverse diameter to the antero-posterior diameter, on the contrary, remains constant for all ages. The fetal conditions are said to be due to the flexion of the head. In other mammals the axis has the superior articular surfaces disposed so as to face cranially and backwards, contrary to those of man, probably in correlation with the upright position of man.

Lymphatic Vessels of the Aorta.

In the *Anatomical Record* for June, 1922, FERDINAND C. LEE describes a specimen in which the lower part of the thoracic aorta was found after intra-thoracic ligation of the thoracic duct to exhibit a distinct lymphatic plexus when the animal had been killed and Berlin blue injected into the mesenteric lymph vessels. In the specimen described the thoracic duct had established a lymphatic-venous connexion with the ninth left intercostal vein. An examination of the aorta disclosed a deep aortic plexus which was situated approximately at the junction of the *tunica media* and the *tunica adventitia*. No branches were seen to enter the *media*. Besides this deeper aortic plexus a more superficial aortic plexus could be discerned in places lying in the periphery of the *adventitia*. The paper is illustrated by figures and contains a discussion of previous work on this subject.

Vascularity of the Heart Muscle Fibres.

JOHNSTONE, WAKEFIELD AND CURREY (*Anatomical Record*, September 20, 1922) describe their examination of the Purkinje fibres and of the heart muscle to determine the relative vascularity of each tissue. Their aim was partly to investigate the debated question as to the contractility of Purkinje fibres. It is argued that if the Purkinje fibres exhibited contractility, they would have a vascular supply equal in abundance to that of heart muscle. The technique is carefully described. The coronary arteries of calves were injected with India ink immediately after death at the slaughter-house. The results of their observations indicate that there is a considerable difference in vascularity between the two tissues. The capillaries of the Purkinje fibres are confined to the peripheral part of the fibres, while the capillaries of the heart muscle fibres penetrate deeply into all parts of the fibres.

MORBID ANATOMY.

Elective Localization of Bacteria in Tissues.

E. C. ROSENOW AND J. G. MEISSER (*The Journal of Laboratory and Clinical Medicine*, September, 1922) have recently succeeded in producing nephritis experimentally by devitalization and infection of teeth in dogs. During the past few years Rosenow has been studying the elective localization of bacteria following various methods of inoculation. It is not essential to inject the bacteria intravenously in order that they may localize in the tissues for which they have elective affinity. Characteristic localization has been obtained repeatedly following other methods of inoculation. Definite ulceration of the stomach in guinea-pigs occurred following intra-peritoneal injection of the streptococcus from a suppurative sinus from an infected tooth of a patient with acute ulcer of the stomach. Suppurative pulpitis and hæmorrhagic œdema of the periosteum opposite the roots of teeth in animals followed the intra-peritoneal injection of the streptococcus from the pulp of a tooth of a patient who had recurrent attacks of pulpitis, dental neuritis and myositis. Localization in the alveolar epithelium of the lungs in guinea-pigs occurred after intra-peritoneal injection of the highly virulent green-producing streptococcus from influenza. The extreme specificity for muscle tissue of a streptococcus from a patient suffering from myositis was shown in an experiment in which the organism injected intravenously not only became localized in the muscles of a pregnant rabbit, but also in the corresponding muscles of the fetus. In the light of these striking results there is no reason to doubt that specific localization in distant tissues or organs may occur from chronic, localized, often symptomless infections. In their present work the authors used a staphylococcus obtained from the tonsils, nasal mucous membrane and antrum of a patient suffering from nephritis. Intravenous injection of this organism in rabbits showed that it had an affinity for the kidneys. Pure cultures of this staphylococcus recovered from the lesions in the kidneys of the rabbits were used to infect the pulp chambers of the teeth in dogs and in these animals also the staphylococci had an affinity for renal tissues. The authors think that the experimental production of a systemic disease through the devitalization and infection of teeth in dogs with an organism having elective localizing power removes all objections to the acceptance of the theory of focal infection and elective localization as an important factor in the ætiology of disease.

Bacillus Aerogenes Capsulatus Infection Complicating Typhoid Fever.

H. R. MÜLLER (*The Medical Record*, February 4, 1922) states that secondary infection with the *Bacillus aerogenes capsulatus* as a complication in

the course of typhoid fever is probably an infrequent occurrence, for only nine instances could be found in the literature. The author adds another to this number. His patient, a white man, aged twenty-nine years, died three days after admission to hospital. At the time of admission the patient's leucocytes numbered 2,400 per cubic millimetre. Three hours before death an area of subcutaneous emphysema about the size of the palm of the hand was found in the right anterior axillary region and the leucocyte count was found to be 23,400 per cubic millimetre. Autopsy revealed the presence of gas in the heart blood, portal blood, spleen, peritoneal cavity, etc., but there was no perforation of the intestines, nor was there any inflammatory exudate present in the peritoneal cavity. Close to the ileo-caecal valve were large typhoid ulcers which had sloughed considerably but were not entirely cleaned out. Slightly higher up the ileum the ulcers were filled with grey necrotic material. It seems quite certain that the general invasion by the gas bacillus took place before death. There was nothing found at autopsy to account for the emphysema except the general gas bacillus infection. Although the entrance of the gas bacillus from the intestinal canal through an ulcer of the intestine could not be positively established, still this seemed most probable. That death followed soon after the appearance of a small area of subcutaneous emphysema tends to confirm the observations of Flexner that the maintenance of life is probably impossible after this organism has established itself in the blood and produced gas there. Much of the gas found at autopsy is probably a *post mortem* development, the amount depending, among other things, upon the time that elapses after death before the autopsy is performed and upon the internal temperature of the body. In view of the fact that the *Bacillus aerogenes capsulatus* is found in the gastro-intestinal tract of the majority of individuals, it is rather surprising that the occurrence of secondary infection with this organism in typhoid fever is not more frequent than is reflected in the literature.

Gram's Stain for Bacteria in Milk.

G. J. HUCKER (*Journal of Bacteriology*, July, 1921) has elaborated a new modification and application of the Gram stain which can be used in staining milk smears. The stain is as follows: The gentian violet solution consists of aniline oil, three cubic centimetres; alcohol (absolute), seven cubic centimetres; water, ninety cubic centimetres. These are shaken together and filtered. Two grammes of gentian violet (Grubler) are then added. The iodine solution consists of iodine, one gramme; potassium iodide, two grammes; water, three hundred cubic centimetres. The decolorizing solution consists of five parts of a mixture of aniline oil and xylol in proportion of two to one and ninety-five parts of 95% alcohol. The counter stain consists of 4.5 grammes of Bismarck brown with fifty cubic centi-

metres of boiling water. This is filtered and thirty cubic centimetres of 95% alcohol are added. Milk smears are prepared by depositing 0.01 cubic centimetre of milk on a clean glass slide and spreading with a needle over an area of one square centimetre. The smears are dried and placed in xylol until the fat is dissolved; they are then removed and drained and immersed in 95% alcohol for two minutes for fixing. The slides, without being allowed to dry, are then placed in the gentian violet for forty-five seconds, blotted or allowed to drain after removing from the stain and immersed in the decolorizing solution until no more stain can be removed. They are then counter-stained in Bismarck brown for forty-five seconds. Consistent results could not be obtained when alcohol or acetone was used as a decolorizer, as the stain was removed from the Gram-positive bacteria before the milk was sufficiently de-stained. A heavy precipitate will be deposited on the smear if the Bismarck brown is not frequently dissolved and filtered. If the Bismarck brown stains the background of milk too deeply, the slide may be immersed for a few seconds in a weak aqueous solution of acid fuchsin after counter-staining.

Transparent Milk as a Bacteriological Medium.

J. H. BROWN AND P. E. HOWE (*Journal of Bacteriology*, September, 1922) state that milk may be transformed into a transparent culture medium by the addition of small amounts of various salts. Sodium citrate seems to be the most suitable for this purpose. In such a medium there may be observed not only the ordinary reactions of various bacteria in milk, but also some others not observed in untreated milk. The principal advantages of transparent milk as a medium reside in the greater visibility of changes which occur in it. Indications are much more easily seen in it than in opaque milk. Clouding and the formation of sediment due to bacterial growth may be observed, as in bouillon when no visible change whatever is produced in ordinary opaque milk.

Growth-Promoting Function of Leucocytes.

ALEXIS CARREL (*Journal of Experimental Medicine*, October 1, 1922) has found that leucocyte extracts, like embryonic tissue juice, possess the power of increasing the rate of multiplication of fibroblasts *in vitro* and that leucocytes secrete substances *in vitro* which also promote cell multiplication. He states that peritoneal exudate or connective tissue invaded by leucocytes acquires the power of increasing the rate of multiplication of fibroblasts and that leucocytes are capable of bringing growth-activating substances to tissue cells. Further, he believes that leucocytes may have the important function of promoting cell multiplication in the parts of the organism where they accumulate under certain conditions.

Scientific Societies.

THE MEETING OF THE AUSTRALASIAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE AT WELLINGTON.

BY A SPECIAL CORRESPONDENT.

VICTORIA UNIVERSITY COLLEGE, WELLINGTON, the meeting place of the Sixteenth Meeting of the Australasian Association for the Advancement of Science, stands high up on the hills that encircle the land-locked harbour of Wellington. The view is a magnificent one, perhaps the finest of any university in the world. Immediately below is the main city and harbour, from which ascends the Kilburn funicular railway with its seats set at an angle to keep the passenger upright. On the left is the great linear fault scarp, leading to the Hutt River Delta, while on the right the city is spreading over the lower slopes of Newtown and Miramar. The harbour itself is almost closed in by a peninsula, the isthmus of which rose above the sea since Captain Cook's visit. Among the high ranges in the background are Wainui-omata and Orongaronga Rivers from which the city water supply is drawn. These we visited and strolled for a mile or so through the dense, creeper-laden trees, fern-covered and adorned with remarkable and beautiful parasitic and mossy growths on trunks and branches. Such bush or rather jungle reminds the traveller of the bush of the Northern Rivers of New South Wales, but is rather unexpected in this cool climate.

Wellington is so hemmed in by hills as to have practically only one land communication (one road and one railway) with the rest of the North Island. The road leads over the Paikakaraike hill, with beautiful views of the steep, rocky coast, of pleasant bays and beaches, reminiscent of the views of the South Coast of New South Wales from the Bulli Pass. Out at sea is Kapiti Island, strikingly picturesque and now reserved as a sanctuary for birds.

The city itself has its own features. Interest is concentrated on the Municipal Milk Depôt, which supplies over 75% of the milk consumed in the area and is a thoroughly business-like and going concern, run on the latest scientific principles. Wooden buildings are predominant, thanks to the earth-shaking proclivities of these otherwise fortunate islands—"God's own country," as their newspapers delight in head-lining it. Concrete is now becoming the rule and the new Roman Catholic Cathedral in concrete is, though unusual to the visitor, a well-designed building. The new parliamentary building, in the pleasant, light grey marble from the marble hills of Nelson, is impressive in its proportions and forms a noble façade, a contrast to the inevitable picture theatre opposite. Wellington as a summer climate impressed us with its coolness. The remarkable infrequency of horses and only moderate number of motor-cars reduces the dust content of the air and it can also be truthfully said that there are no flies in Wellington.

Child Hygiene.

DR. HARVEY SUTTON, as President of the Section of Sanitary Science and Hygiene, delivered an address entitled "Recent Progress in Child Hygiene" (see page 253).

Tropical Hygiene.

DR. R. W. CILENTO, in a paper on tropical hygiene in the tropical areas of the Commonwealth and mandatory territories, pointed first to the essentially dissimilar characters of tropical Queensland and of Papua and other Pacific islands. The latter corresponds closely to most tropical countries as to the moist climate, the presence of a large, indigenous native race, who form the reservoir of disease for the small white population of officials and planters. The black race supplies all labour and lives a life simple in its needs, but adapted to local climatic conditions. Queensland, on the other hand, is unique amongst tropical white settlements. The black is unimportant and rapidly dwindling. He has few diseases and is of little importance in disease transmission. The white man supplies practically all labour, but at relatively high rates

of cost. The climate also only justifies the term tropical along the coastal strips, the hinterland being elevated and healthy, drier and cool at night. Further, the fact that the land masses are disposed so that the line of greatest heat is 9° north from the Equator, renders southern latitudes less severe.

The problems, however, common to both are the need for more knowledge as to local diseases. Research is necessary into the diseases now endemic, yet imported originally, and into those prone to invade Australia. Small-pox, for example, has visited Australia over one hundred and thirty times, but, arguing on the analogy of other countries and certain vague names often met with, coast fever, colonial fever and the like, the problem of true but unknown indigenous disease demands careful investigation. At present a great dearth of doctors trained in tropical diseases delays this.

The other factor common to both is the need for adaptation to climatic conditions of the white man's customs as to housing, diet, clothing, hours of sleep, work, exercise, restriction of alcohol. The neglect of these, so typical of the newcomer in the tropics, was graphically described and its inevitable penalties in hyperemia of the liver, then congestion and later hepatitis and in the creation of tropical neurasthenia. Early rising, hard work in the morning, the mid-day siesta, social relaxation in the afternoon, light diet, light, airy, washable clothing neutralize the tendency to the tired feeling which results from the rigid adherence to European hours so completely unsuited to the climate.

We may look forward with interest to the work of the re-organized Institute of Tropical Medicine at Townsville under Dr. Cilento's supervision.

DR. D. G. ROBERTSON, Director of Industrial Hygiene in the Commonwealth Department of Health, gave a paper on industrial hygiene. Figures show a steady increase of female labour and the difficulties of occupational health control are nowhere realized. The work of the Department was outlined and indications were given of the further investigation and further extension considered necessary.

The Control of Venereal Disease.

DR. E. S. MORRIS, Director of the Health Department of Tasmania, contributed a paper on education as a factor in the control of venereal disease. In his introduction some controversial points were raised which aroused the keen interest of both medical men and the lay public. Dr. Morris prefaced his remarks by proclaiming his opinion that legislation was a subsidiary factor and legislative control a comparative failure. He spoke in pessimistic tone of the experience in Tasmania of compulsory notification.

DR. ELLIOTT, who is a member of the Committee of the New Zealand Board of Health, defended notification, which has been recommended in the Committee's report and is strongly supported by the profession in general. He considered that notification was essential for the control of all contagious diseases and logically venereal diseases could not be treated differently from less important diseases, such as scarlet fever and diphtheria. He further took up the attitude that Dr. Morris's remarks were really an attack on a section of the medical profession, stating that they were too careless in their methods or too lazy to attend to the duty of notification or feared that they might be subject to the abuse of recalcitrant people and, further, that he prophesied that this decline in public spirit or honesty of the medical profession would continue until the law of notification became a dead letter. This Dr. Elliott considered as great an error as Dr. Morris's prognostication that if the best treatment was given free and no questions asked, the vast majority of patients would proceed with the treatment and be guided by their medical advisers.

On the contrary, in the venereal diseases clinics of New Zealand, with these conditions of free, efficient and unquestioned treatment the majority of patients, especially women, did not proceed with treatment till cured or even free from infection and the clinic doctors all favoured notification of these recalcitrant patients. It must be remembered that numbers of these patients were really deficient in moral sense and no education nor facilities for treatment would appeal to them, thus rendering notification and following up essential.

Notification was also necessary to estimate the amount of venereal disease and to know whether it was increasing or diminishing. Dr. Elliott quoted as evidence of medical and expert support of legislative control the recommendations of the Australasian Medical Congress, Auckland, 1914, the Federal conference of February 4, 1922, the reports of the Commissioner of Public Health of Western Australia and the editorial on the subject in THE MEDICAL JOURNAL OF AUSTRALIA. In New Zealand the recent inquiry was originated by the New Zealand Branch of the British Medical Association and only three medical men in the whole Dominion had expressed themselves against the proposals.

After this somewhat provocative preface Dr. Morris passed on to his main thesis. He emphasized the great value of an educational campaign designed to enlighten adults on the biological phenomena of these diseases, the causes underlying their dissemination, the dire results to the individual and the race and, above all, for the effective instruction of boys and girls, young men and young women, so that they would be protected from eating the bitter fruit of remorse, if not of despair.

He was convinced that the prevalence of venereal disease in Australia was directly proportional to the sexual promiscuity prevalent in the community, while the clandestine or amateur prostitute was filling the position previously occupied by her professional sister.

Without dealing with the details of when, what and how to teach, he advocated commencing as soon as the child was naturally prompted to ask questions. Such teaching would be mainly individual. The whole truth and nothing but the truth should be given in the most open and most wholesome manner. The broad outline of how to teach should be laid down with the support and approval of various bodies, such as educational, medical and parents' associations and others.

A serious hiatus in personal and civic education occurred in the period of adolescence when the boy or girl, free from the restraint of school, was brought in contact with all the pitfalls of life. The youth, just when emotions, character and guiding habits were established, was left far too frequently to the guidance of others who lacked ideals and whose sex knowledge was based on erroneous if not perverted conceptions.

Education was the next necessary step to be taken if they wished to solve the problem of the control of venereal disease.

DR. E. H. WILKINS, Director of School Hygiene, strongly supported Dr. Morris's educational ideas. He believed in beginning on general lines and dealing with the child in a frank and straightforward manner. In childhood it should be treated rather as an educational matter than a medical one.

DR. HARVEY SUTTON agreed with Dr. Elliott as to the inevitable necessity of a backing by legislation and notification and pointed out that identical objections were laid previously against notification of tuberculosis. Dr. Morris had taken too pessimistic and perhaps too local a view of notification, but the general consensus of medical opinion appeared to be against him. He agreed, however, with the necessity of an educational campaign. The question of class instruction of sex knowledge was at present *sub judice*. The school medical officers were opposed to such direct instruction in primary schools on the ground that teachers were not equipped at present to give such instruction in the best fashion. No education department was likely to undertake such instruction in the primary schools unless parents as a body expressly desired it. Should this method be eventually adopted, he considered isolated sex lessons by a visitor undesirable as giving undesirable prominence to sex and tending to produce a sex obsession. The proper attitude to sex was best built as a normal development of biological or Nature study of plants and animals and, finally, the human reproductive instinct dealt with as an integral part of hygiene teaching by the class teacher. So far in New South Wales the girls at the high schools had a course of lectures on personal hygiene, including sex and the care and feeding of babies, given by a woman medical officer, while teacher students received more definite instruction on sex and the reproductive instinct in their course on hygiene. This was given by a medical teacher of the same sex as the students of the class.

Everyone practically was agreed that the parent was the natural person to give sex instruction in direct, truthful response to the child's normal curiosity as it developed. The Anglican bishops of Australia had issued an excellent booklet of advice to parents on the best methods of imparting this knowledge to their children.

Plague Prophylaxis.

The rat and flea problem in the prevention of plague was ably dealt with by Dr. J. S. PURDY, Metropolitan Medical Officer of Health of Sydney, in a paper which presented the experience up to date of active measures against these vectors of the disease.

A comparison between the Sydney epidemic of 1900 and that of 1921-1922 showed that in January to August, 1900, 303 persons were affected with 103 deaths in the metropolis with a population of 461,336, while in the recent epidemic thirty-five persons were affected with eight deaths in a population of 1,046,980; only fourteen of these persons were in the city itself.

The history was outlined of the conviction of plague in the rat as the precedent factor to plague in the human subject and the realization of the danger from wharfages and thickly built-on areas infested with rats, together with the value of systematic examination of rats killed by the official rat-catchers in predicting the appearance of human outbreaks.

In 1902 rat-infested buildings were dealt with by digging out the rat-holes in the floors and saturating with acid solutions of corrosive sublimate (one in five hundred). This was also used for spraying walls, which were then lime-washed. This method preceded the final finding against the flea of the Indian Rat Commission of 1907.

Corrosive sublimate is practically useless as a germicide and is now replaced by kerosene emulsion or by petrol mixed with "Cyllin" (25%), which form excellent germicides or pulicides.

Concreting of houses and wharves, together with policing by a rat-catching staff, have borne fruit.

Mus rattus forms now over twice the number captured and killed, compared with *Mus norvegicus*, which it equalled twenty years ago, probably owing to the numbers of the latter poisoned by public. Evidence points to *Mus norvegicus*, the brown rat, being first affected and passing the infection on to *Rattus rattus*, the black or house rat, and then to human beings. The former burrow, are easily trapped and are kept out by rat-proofing. The black rat lives in loose material in ceilings and other hollow spaces, are trap-shy, often rely for water supply on uncovered cisterns in water-closets and are readily introduced in merchandise into "rat-proof" buildings. Cyanide fumigation is absolutely effective against both rats and fleas.

The prolific capacity of the female rat, with its five litters of eight young and the possibility of one pair of rats producing 680 in nine months shows the impracticability of complete extermination. The high intelligence of the rat renders no one method completely effective.

The four methods used must be accompanied by a close study of the habits and life history of the rodent. Hunting with a good working terrier is recommended. Traps are liable to be ineffective, owing to "trap-shyness." The "break-back" spring trap is favoured, with bait, such as fried bacon, tied on with the hands gloved and smeared with oil of aniseed when the traps are manipulated, placed close to a wall, smoked, if new, to render inconspicuous and so forth. In a wire-trap a female rat is best left in and rats caught are best killed elsewhere, as the squealing frightens the others.

The Rodier method of killing the females and releasing the males is inappropriate to large cities, but might well be tried at Lord Howe Island.

Poisoning is the most effective method of ridding premises of rats. The poison must be relatively harmless to domestic animals, cheap and readily procurable, reasonably small doses should be effective, tasteless or not repellant in taste, easy and clean to handle and easily mixed with the appropriate food vehicle, should keep well and retain its toxicity.

Barium carbonate is fairly toxic to other animals. Squills are irritating to handle and gloves should be used. Rat baits of thirty to sixty grains should be readily taken.

Baits should not be spread on bread, but be easily applied, attractive, fresh. The best is a mixture of oatmeal and fat paste or small sweet biscuits of fish meal. These are preferred by black rats.

Fumigations with hydrocyanic acid gas, sulphur dioxide, chlorine, carbon bisulphide and carbon monoxide are all effective. Rat viruses have proved failures and are unlikely to succeed where the more virulent plague virus fails.

The chief flea concerned as intermediary is the tropical or eastern rat flea, *Xenopsylla cheopis*.

Reliance, however, on pulicides as against bactericides for the arrest of plague has been severely criticized. The possibility exists that excreta from infected animals containing plague bacilli may be an agent. While the combination of insecticide and bactericide are accepted, the substitution of kerosene emulsion, a 10% dilution of which kills fleas, while a 10% dilution fails to kill plague bacilli, is of doubtful value.

House fleas from dogs and cats as well as rats hatch under the carpets or in crevices. Domestic pets should be rubbed with one part of kerosene and three of linseed oil or sprinkled with pyrethrum. In a furnished house 10% of a phenol disinfectant is suitable. Schools can be kept free by sweeping with sawdust saturated with such disinfectants and then flooded with sunlight.

In Sydney success was attained in ridding premises of fleas by using a kerosene emulsion—158 parts of liquid soap (not soft soap), 82 parts of kerosene and three parts of water. One ounce to a pint of water (one in twenty) was used. One ounce of nitro-benzol to a gallon of emulsion covers the objectionable odour of kerosene. The mixture can be combined readily with a good phenol disinfectant mixed fresh for use.

The author, in dealing with the recent outbreak in Sydney of plague, emphasized the following points: (i.) Rat-proofing of premises is our best insurance against plague. (ii.) Cyaniding is the most effective means of killing rats and fleas. (iii.) Shutting off of water cisterns helps to clear out the rats. (iv.) Destruction by incineration is the only safe method of garbage disposal. (v.) The division into blocks and organization of block associations was a novel and effective method of attack which insured a general clean up and helped along a good co-operative civil spirit. (vi.) Public health propaganda maintained public interest and cooperation. (vii.) It is impossible to exterminate the rat. They could build him out and keep his numbers down by trapping and poisoning. (viii.) Premises, public halls, cinema halls, theatres, rail or motor carriages should be sprayed with this kerosene emulsion, to which oil of sassafras, oil of eucalyptus, citronella or linseed may act as deodorant.

Ropiness in Bread.

Two papers of direct practical importance were given by Mr. ARMITAGE, Government Bacteriologist of Auckland. The first dealt with ropy bread, with an exhibition of specimens of bread and of the microscopic and cultural characters of the various races of the *Bacillus mesentericus*. Both the local varieties and standard cultures from the national collection were shown. The infection appears to accompany the grain to the flour mill and its appearance is due almost invariably to the use of returned loaves of bread. These are reground to form flour for manipulating the dough in the new baking and cause the rapid appearance of ropiness. The prohibition of the use of returned loaves effectively prevents this objectionable though apparently harmless phenomenon. They can be employed in feeding pigs.

Water Supply.

The second paper dealt with a serious difficulty which arose in the water supply of Auckland by the blockage of pipes less than six inches in diameter with extensive masses of red, soft material. *Cladotrix* was found in abundance at the reservoir, but is not responsible for the appearance of this annoying growth. Not only is the water flow reduced to a trickle, but disturbance of the pipes produces a flow for a time of dirty red water. It is proposed to prevent the rusting and growth by brushing the mains and pipes with tar.

While dealing with water supplies, Mr. Armitage drew attention to the great value of chlorinating water supplies as a cheap and effective method of sterilizing water and eliminating the water carriage of typhoid bacilli. A graph illustrating the steady decline in the incidence of typhoid fever in America, with rise in employment of municipal chlorination plants was of interest. The change over in the control of the London water supply from filtration and sedimentation to chlorination was also referred to by the speaker.

Fish as Food.

PROFESSOR MALCOLM, Professor of Physiology, Dunedin, gave in his paper on fish as food some impression of the work that is being done on this subject for the New Zealand Institute. Fish is dealt with in the text-books much in the same way as white meat, yet by its very origin is different in many important particulars. Carbohydrate is absent, glycogen not being present in fish muscle. The fat is of a different type, oxidizing more readily in the body than the fats of ordinary meat. They contain as much as 10% of non-saponifiable matter which has a higher caloric value than the saponifiable moiety. This is probably incapable of digestion or absorption and therefore reduces their value in diet calculations. It probably has an aperient action like mineral paraffin oil. It is marked only in fatty fish, such as herring, mullet and terakihi. The protein characters are probably different to meat, but the investigation is proceeding. Extractives, salt and vitamins were also referred to briefly and appear unimportant in the ordinary edible fishes examined.

The Disintegration of Native Pacific Races.

CAPTAIN PITT-RIVERS, President of the Section of Ethnology and Anthropology, discussed some problems of mental anthropology and the problem of civilization. Dividing anthropology into its two branches of physical and of social or cultural, the latter may be again separated into descriptive and analytic and psychological aspects of the applied science of culture. Human anthropology includes the study of man's origin and development and relies on three types of evidence drawn from ethnography, from morbid psychology and from child psychology. Modern psychology has regard for the study of man's early origin and each one recapitulates in development the whole life history of the race.

Two special values may be claimed. An intimate knowledge of primitive cultures must not only aid in understanding and solving the problems of civilization, but should be part of the essential equipment of the administrator who rules savage tribes and subject races. White influences are practically universal and nearly always disintegrative and are radically affecting the institutions and life of the islanders of the Pacific. It is the white man's duty to investigate the nature of the change, its determining factors, its results and consequences. With the degree of integration and disintegration exhibited as a test of stability or social health of a clan or a tribe, he must first find out in what the factors of social cohesion actually consist, that is, what makes the community, instead of an unorganized horde of men.

Social integration in the Papua-Melanesian and the Micronesian communities depends on (i.) the chieftainship. (ii.) magic and sorcery, (iii.) the system of exchange of gifts, partly ceremonial and non-economic, partly economic.

Tribal law and morality is unwritten, yet less transgressed than European morality by Europeans. The whole history of contact with these natives is a story of wilful destruction of native culture and morality in a vain endeavour to replace it with a culture and morality neither capable of being absorbed nor of ever proving efficient.

Polygamy, for example, in the Melanesians of New Guinea decides the prestige and economic position of the chief. In the Trobriands this is emphasized by the traditional obligation in a matrilineal community for every man to contribute to the maintenance of his sister's husband. The superior economic position thus insured enabled the chief to control the communal labour of all tribal enterprise. The missionary policy of abolishing polygamy means not only the disappearance of chieftainship, but also of tribal enterprise and of society in general.

Incidentally, polygamy provides the only practical means of absorbing the surplusage of women which exists in all healthy communities which are not becoming extinct.

Primitive magic and sorcery also perform a most important social function. A study of the institutions and organization of the tribes of the Nigabunga River district shows the power of chieftainship largely resides in the power of sorcery.

Primitive economics is a subject of first importance. The primitive communism of political theorists has no existence, except in their own minds. Unconscious psychological processes decide the capacity for communism or individualism and in the mechanism of these processes and their effects on behaviour lies the explanation of primitive institutions. Colonial administrations, by their ignorance and of indifference to this problem, have struck at the very roots of tribal life and cohesion.

Certain work can only be performed by the united efforts and cooperation of several men. Why do they work together? What is the human motive that sets the machinery in motion and keeps it going?

Social evolution may be viewed as a progressive growth of complexity and in the coalescence of smaller social units into larger ones, the smaller remaining component subdivisions, such as families into clans, clans into tribes, tribes into nations, nations into empires. Each step is in the direction of wider integration and in heterogeneity. But greater organization brings increasing specialization and this inevitably must foster the development of individualism. As the difficulties of maintaining integration increase, organization must become more efficient. When organization and efficiency fail to keep pace with the progress of evolution, disintegration sets in and the decay of culture is witnessed. And this, broadly speaking, has been the history of the rise and fall of civilization.

Following on this address resolutions were adopted for confirmation by the meeting that urgent representations be made to the Governments of Australia and New Zealand, first to segregate for further investigation certain untouched areas in their Pacific dependencies; second, to inquire into the causes of the extinction or rapid decline of native races in the Bismarck Archipelago and elsewhere; third, to carry out the above, competent committees of investigation be appointed to make inquiry and also to record annually the vital statistics of these areas. Sir Baldwin Spencer, Professor Berry, Dr. Buck, Messrs. Anderson and Skinner and Captain Pitt-Rivers were nominated for this committee (with power to add to their numbers persons qualified in the sciences of anthropology, ethnography, medicine and psychology).

In addition, the section considered that insufficient attention is paid by the universities to the study of anthropology and ethnology and, further, that adequate training in these sciences should be required before appointment to the civil services administering subject races under Australian and New Zealand Government.

Variation of Human Energy and Rhythm.

A very lengthy and important paper, bristling with data and complicated graphs, was contributed to the Education Section by Dr. Fitt, of the Teachers' College, Auckland. He dealt with the variation of human energy and rhythm throughout the year.

The paper was partly based on a thorough investigation of three hundred and fifty-five scholars of Faraday Street, Carlton, Melbourne, between the ages of eight and fourteen years and in the third to the eighth grades. The seasonal growth in height and weight and certain psychological factors, memory, concentration, attention, speed and accuracy were tested each month throughout the year according to carefully standardized methods and correlated to the school teaching demands. Fatigue appeared to increase during the school year. The year appeared to divide itself into two distinct halves: February to July, August to January. For example, the increase in weight averages 444 grammes in the first half, as compared with 127 grammes in the second-half of the year, the variations in individuals being not less than 2:1 and even amounted to 19:1. Following the seasons, some loss occurred in April and May, but this was small as compared to that of September and December; while the autumnal increase was considerable, the spring rise was much less.

Growth in height occurred in reverse order. It was 0.38 millimetre in the first as against 0.46 millimetre in the second period, with the greatest rise in August.

Memory test showed that in August it was lowest, while height and mental functions generally seemed associated. Everything pointed to greater and more irregular changes in the second half of the year, with a specially unstable period about August.

Following on this experience of rhythm of energy and growth in children, Dr. Fitt put forward as an explanatory hypothesis the persistence of the phenomena of hibernation in lower animals. He drew analogies to the graphs of educational effort and growth changes and the graphs of the human phenomena of conception, suicide and death. Conception is calculated as nine months before birth, the frequency of which per month, as given by the Commonwealth Statist, is far more common in the second half, with a maximum about October. Suicide rises similarly, with an abrupt rise at July and August, the most unstable period of human variation. Deaths from influenza and from all diseases increase in winter, as would be expected from consideration of the irregular, unstable and changeable rhythm of that season of the year. The dominance of deaths appears to be controlled by the seasonal rhythm of human growth and decay.

Mere temperature appears insufficient to explain these phenomena, except as an essential part of seasonal variation. Various American and continental investigations bearing on these points were discussed and were considered to demonstrate in their findings the truth of the hypothesis presented.

The Wellington Milk Supply.

Wellington is noted in health circles as possessing a municipal milk supply. The location of this city, the administrative capital of the Dominion, with a population of about 110,000, is peculiar in that, surrounded as it is by steep hills, its supply of milk must come from dairies ten to twenty miles away and come into the city by one rail and one road entrance.

In the summer supplies are abundant, but in the winter the severer weather and the cost of hand-feeding cause a tendency to shortage and an increased price at the dairy.

Dr. Frengley, now Deputy Director-General of Public Health, originated the idea of municipal control when Medical Officer of Health for Wellington. He aimed at a virtual monopoly, especially of distributive control, in the interests of the citizens, that is to say, the consumers. Eventually he hoped for supplies of milk from sound herds in clean, properly supervised dairies, chilled at the farm and in transit and early delivery to the consumer of clean, cold, raw, untreated milk. This ideal has not yet been reached. The law does not restrict sufficiently the casual supplier from near at hand, who profits by the demand created by the municipal methods and the increased prices for the winter milk. Hence the municipal supply, though admirably controlled, still represents about 75% only of the general supply or about four thousand gallons a day.

The present manager, Mr. Herron, has materially assisted to place the whole affair on a better business footing. The cans of milk come in within twelve hours of milking and are sampled, strained, stirred to equalize, then pasteurized for half an hour, cooled, filled into bottles, capped and packed. Ingenious mechanical devices simplify handling and reduce the human factor very greatly.

The bottles (a dirty bottle from a householder may be refused) are cleaned by inverting them in crates with openings in the bottom. The cradles pass along a moving wooden track, which stops at regular intervals long enough to permit of jets conveying warm rinsing water, hot water, then steam and finally ejecting the crates to cool in a thoroughly clean and sterile condition.

The crate passes on, to be turned over by hand, so that the bottles are upright again, and then into the filling machine, which delivers into each bottle the exact amount of milk and allows it to pass on to the capping machine.

Pasteurization is thorough, lasting at least twenty minutes at about 70° C.

Most important is the careful, constant checking system of the laboratory. Here the Guerbert method for fat-estimation assesses the quantity of butter fat, on which all

payments to the farmer are based. Of even greater importance is the reductase test. Tubes of milk to which dilute methylene blue is added, are incubated at 37° C. and the number of minutes noted for decolorization. Dirty milk means early reduction. The law insists on 180, the farmers now accept 250 minutes.

For Class "A" milk full rates are paid. As a rule it does not decolorize under 300 minutes. Under 250 counts as "B" class, with a reduced scale of payment, a notification to the dairyman and a listing of the dairy for a visit later by the dairy inspector. The reductase test has proved invaluable. Too great delay in decolorization means preservative added. Addition of water is revealed by consideration of the alteration of freezing point. At present work is being done concerning the introduction, in addition, of suitable bacterial standards.

The cost in summer is 5½d., in winter 8d. a quart. Not only is it cheaper than in Australian cities, but its butter fat varies up to 4.25% and is not less than 4%. The treatment and distribution methods are excellent. Farm and herd inspection still requires closer attention.

General Impressions.

Viewed as a whole, the work of the Congress appeared to be orientated by a few special dominant ideas. First, undoubtedly came the immediate urgent demand for first-hand investigation and research into local problems, both in Australia and New Zealand, and the national need of fostering the fullest possible development of pure and applied science.

Second and of almost equal importance to this, must be reckoned the pressing problems of the Pacific. The control of the mandated territories under the League of Nations forms a new and most difficult duty of the governments of the two Dominions. The approaching visit of the Pan-Pacific Congress in Sydney and Melbourne in September, 1923, has precipitated scientific and public interest in Oceania and its problems.

Medical Matters in Parliament.

THE HOSPITALS AND CHARITIES BILL.

(Continued from page 251.)

ON October 11, 1922, the Bill was further considered in Committee.

In connexion with Clause 40:

(1) The Minister may (out of moneys to be provided by Parliament for the purpose, but not out of the Fund) establish and wholly maintain intermediate hospitals; and any such intermediate hospitals shall be controlled and managed as prescribed by regulations.

(2) Every intermediate hospital (not being an intermediate hospital established and wholly maintained by the Minister) shall, save as otherwise expressly provided in this Act, be subject to any law for the time being in force relating to private hospitals.

(3) The committee of any institution outside the metropolis may with the approval of the Board set apart and maintain any part of such institution or any beds in such institution for the reception of patients on payment being made in accordance with such inclusive charge or such fixed scale of charges as is prescribed.

DR. ARGYLE moved that the word "wholly" in Sub-Clause (1) be omitted. Dr. Argyle said that, in his opinion, the first principle of an intermediate hospital was that it should be self-maintained or at any rate partly self-maintained. In view of the fact that provision was made for the reception of fees the word in question was unnecessary.

MR. J. W. BILLSON asked whether the Government intended by this Bill to establish intermediate hospitals and charge the patients a fee that would cover the expense

of running the hospitals. With the word "wholly" in the clause, it would lead to the belief that the Government would pay without asking anything in return.

MR. MCPHERSON said that intermediate hospitals would be an experiment. It would be necessary to come to some arrangement with the medical profession. Difficulties might arise if intermediate hospitals were established as Government institutions. If the word "wholly" remained in the clause and the institution was "wholly" maintained by the Government, it would become essentially a Government institution. This might cause trouble with the doctors. Without the cooperation of the medical profession, it would be impossible to establish intermediate hospitals. The medical profession held that there should be some limitation to the income of a man before he was allowed to make use of an intermediate hospital as a patient. In reply to Mr. J. W. Billson, he also said that the doctors would charge the patient and not charge the institution.

MR. J. W. BILLSON said that this was simply a method of providing an intermediate hospital for the medical profession.

DR. FETHERSTON said that there were already a large number of "intermediate beds" in various hospitals in the metropolis. These probably numbered five hundred. The patients occupying these beds were treated at reduced fees. In fact, a great proportion of the work done by members of the medical profession in Victoria was done at rates lower than the schedule rates of Medical Society of Victoria. The medical profession would impose one condition in regard to intermediate hospitals and that was that medical practitioners would not attend patients in intermediate hospitals if there was going to be a fixed staff. It was necessary that they should be open, like private hospitals, to all medical men. No objection was made to a man who was not a member of the British Medical Association as long as he was honest and did clean work. They simply did not meet him in consultation or work with him. It would also be necessary to have full inquiry made, so that medical men would not be taken down by wealthy people taking advantage of intermediate hospitals.

MR. WARDE said that the full cost of staying in an intermediate hospital would have to be brought much lower than even the reduced rate before the bulk of the community would be able to take advantage of such places.

MR. PRENDERGAST opposed the omission of the word. If the word were omitted, the provisions in regard to intermediate hospitals would be of little value, for it would be impossible to establish hospitals that would be within the means of the people.

MR. LEMMON said that there should be an inclusive fee in connexion with intermediate hospitals, so that a man would know just what he had to pay before he was admitted as a patient. Payment should not depend on the size of a man's pocket, yet this was what was proposed in the institutions that it was proposed to establish. If the Government struck out the word under discussion, they might just as well hand the intermediate hospitals over to the medical profession.

DR. ARGYLE pointed out that there were difficulties about the inclusive fee. It was impossible to say whether a man would be in hospital for two weeks or six weeks and it would be impossible to name a fee which would cover maintenance and operation if the case were a surgical one. He appealed to the committee to omit the word "wholly," because it destroyed the idea of an intermediate hospital. It was not a fact that the medical profession was going to lay down the law and say exactly how much the fee was going to be.

MR. J. W. BILLSON complained that there was nothing to indicate on what basis the patient was to be charged, whether upon the cost per bed, upon the cost of the institution as a whole or in accordance with his means.

MR. MCPHERSON said that he had always made it quite clear that the Government had no intention of setting up an institution to be run by private doctors. He referred to the definition of an intermediate hospital, as follows:

"Intermediate hospital" means a hospital (not being a hospital at which any charitable relief is given) in which patients who are unable to pay the ordinary charges for medical or surgical attendance, nursing, maintenance and medicines, are received on condition of payment being made for such attendance, nursing, maintenance and medicines or all or any of them in accordance with such inclusive charge or such fixed scale of charges as in the case of intermediate hospitals established and wholly maintained by the Minister is prescribed by regulations or, as in the case of any other intermediate hospital, is approved by the Board.

He also said that the charges would be fixed by regulation.

Mr. MURPHY said that the only difference between private hospitals and intermediate hospitals would be in the maintenance charges. The doctors would still be able to charge what they liked. The Board should be given power to inquire into the charges made by medical men in intermediate hospitals.

The amendment was carried.

Dr. ARGYLE moved that the word "wholly" in Sub-Clause (2) be omitted.

The amendment was carried.

Mr. McLEOD moved:

That in Sub-Clause (3) the word "beds" be omitted and the word "wards" be inserted in lieu thereof.

He said that there should be a proper ward for the reception of paying patients.

Dr. FETHERSTON said that this sub-clause proposed to allow the establishment of private wards within a hospital and the treatment of private and not "intermediate" patients. If this were allowed at places like Ballarat and Bendigo it would lead to a very great increase in the incomes of the medical officers of these hospitals at the expense of other medical men of the district. Paying patients should not be allowed in public hospitals in places where private hospitals were already in existence. The best accommodation would be given to the paying patient and it was unavoidable that a difference would be made in the attitude of the staff towards these patients.

Mr. McPHERSON said that there was no need to fear the picture drawn by Dr. Fetherston. It would be necessary for the Board to approve of every instance and there would be on the Board ladies and gentlemen who would protect the interests of the poorer classes, and medical men who could watch the interests of their profession.

Dr. ARGYLE said that he differed from Dr. Fetherston. This provision was not intended for such places as Bendigo and Ballarat. It was intended to apply to places in distant parts of the State where hospitals had been established with great difficulty. Here the patient who could pay, was very often prevented by that fact from receiving hospital treatment at the only place where it could be obtained. In many places the public hospital was better equipped than the private hospital.

The amendment was carried and the clause as amended was adopted.

Correspondence.

PUERPERAL INFECTIONS.

SIR: Those of us engaged in the practice of obstetrics and especially those who have had a large experience as consultants in this very important branch of our profession, must be most grateful to the members of the New South Wales Branch for the great trouble they have taken to produce papers of exceptional interest, such papers being obviously not mere *ex cathedra* statements, but thoughtfully written on the results obtained in their own practices. May I say that these papers and publications

in THE MEDICAL JOURNAL OF AUSTRALIA for the past two years happily reflect the progress in obstetrics during the last decade?

I desire to add my small measure to the sum total, because I believe that every man who collects trustworthy evidence, should give his experience for the benefit of other practitioners. I do feel strongly, as pointed out by Drs. Barrington and Ralph Worrall, that one should not teach students that the majority of cases of puerperal infections are due to auto-infection. Such a doctrine was "comforting and useful in combating the suspicions of patients' husbands and friends," but is indeed most dangerous if we relied upon it in actual practice. Assuredly when clinical evidence and bacteriological examinations are accurately recorded, cases do occur, such as pyelitis, where the most careful asepsis will fail to prevent infection by the *Bacillus coli communis*. As evidence of infection arising in other regions than pelvic or anal, one would point to the *Staphylococcus*, especially the *aureus*, when it finds entrance into the blood stream through the nipple. Even after the evacuation of one or more mammary abscesses some weeks later septic arthritis or an empyema will be found and death result, the terminal infection being a toxic spoiling of the myocardium. Last year three such fatal cases were brought under my notice and the possibilities of such infection are the more convincing if one reads the article in *The British Journal of Surgery* by Lenthal Cheate on the study of cysts and papillomata in the breast. I had the advantage last year of having the original specimens and sections explained to me by the author.

On the continent I found one hospital where during the progress of labour only 2% of examinations had been made *per vaginam*; all the rest were *per rectum*. The results of this method have yet to be collated and I think the opinion of general surgeons should be taken as to whether the frequency of pyelitis is thus diminished.

I desire to emphasize a practical point, namely, the extraordinarily short time rubber gloves are sterilized in many private hospitals and maternity homes before the ordinary examinations.

In support of a statement made by Dr. Lipscomb, I well remember some remarkable recoveries after streptococcal infections. In two cases where I removed the thrombosed veins in the pampiniform plexus of a patient from whom the streptococci were grown in culture from the blood stream before operation and in which the infected uteri were not curetted, but carefully swabbed with strong iodine and drained, not irrigated, these two patients each bore a living child within three years of such serious illness.

In the Pasteur Institute research workers felt assured that they had secured a vaccine for use in such cases and some of the results have already been published; I think that we shall very soon be able to report that intravenous vaccine therapy can show better results than any other form of treatment, judging by the extraordinary results of intravenous protein therapy in enteric fever and, more recently, in rheumatoid arthritis, using dead cultures of the *Bacillus coli communis*, as recently described by Dr. H. Laurie before the Victorian Branch.

I desire to stress an important point that has come much to the front in the last two years, namely, that if a practitioner finds at the onset of labour a serious disproportion between the size of the foetus and the maternal pelvis, it were wise, indeed imperative, that he should at once proceed to perform Cæsarean section or send for skilled help to perform the operation before bruising and trauma has rendered easy the path of microbial invasion.

To practitioners who are in the habit of using the various preparations of pituitary extract, may I emphasize the need for selecting a reliable product and sticking to it? I nearly lost two patients from the effects of preparations which had deteriorated and in which grave depressor effects were manifest. When using "Pituitrin," it were wise to have at hand ampoules of "Epinephrin" and to remember that after prolonged anaesthesia by ether the use of "Pituitrin" is safe, whereas after chloroform anaesthesia it is positively dangerous.

The keynote of the theme of puerperal infections is, of course, prevention. Yours, etc.,

J. W. DUNBAR HOOPER.

Melbourne, February 20, 1923.

British Medical Association News.

NOMINATIONS AND ELECTIONS.

THE undermentioned have been nominated for election as members of the New South Wales Branch of the British Medical Association:

- BENDEICH, JOSEPH HENRY, M.B., Mast. Surg., 1921 (Univ. Sydney), Railway Street, Wentworthville.
 MASON, JOHN WHARTON, M.B., Ch.B., 1921 (Univ. Edinburgh), Tumut.
 STANLEY, PERCIVAL HUBERT, M.B., Mast. Surg., 1921 (Univ. Sydney), Royal Alexandra Hospital for Children, Camperdown.
 STEPHENS, HUGH SEVERIN, M.B., Ch.M., 1922 (Univ. Sydney), Royal Prince Alfred Hospital, Camperdown.

Obituary.

ALFRED OSWALD HOWSE.

It is with regret that we have to record the death of Dr. Alfred Oswald Howse at Sydney on March 2, 1923.

Books Received.

GREEN'S MANUAL OF PATHOLOGY AND MORBID ANATOMY, Revised and Enlarged by W. Cecil Bosanquet, M.A., M.D. (Oxon.), F.R.C.P. (Lond.), and G. S. Wilson, M.D., M.R.C.P., D.P.H. (Lond.); Thirteenth Edition; 1923. London: Baillière, Tindall & Cox; Demy 8vo., pp. viii. + 624, with seven coloured plates and 244 figures in the text. Price: 21s. net.

Medical Appointments.

DR. H. M. B. BOX (B.M.A.) has been appointed a member of the Council of the Footscray Technical School, Victoria.

DR. E. J. BROOKS has been appointed Assistant Medical Officer, Rookwood State Hospital and Asylum, New South Wales.

DR. C. F. DE MONCHAUX has been appointed Medical Officer for Venereal Clinics and Venereal Isolation Hospital, Brisbane, Queensland.

DR. C. J. TAYLOR has been appointed Acting Government Medical Officer at Mackay, a Health Officer and Visiting Surgeon to His Majesty's Gaol, Mackay, Queensland.

DR. ANNIE M. MOCATTA (B.M.A.) has been appointed Acting Deputy Superintendent of the Parkside Mental Hospital, South Australia.

DR. R. G. BURNARD (B.M.A.) has been appointed Medical Officer at the Mount Gambier Hospital, South Australia.

THE following have been appointed Honorary Medical Officers to the Mount Gambier Hospital, South Australia: DR. JULIE M. HARRISON, DR. E. F. HARRISON (B.M.A.), DR. C. E. KING (B.M.A.).

Medical Appointments Vacant, etc..

FOR announcements of medical appointments vacant, assistants, locum tenentes sought, etc., see "Advertiser," page xviii.

CHARTERS TOWERS DISTRICT HOSPITAL, QUEENSLAND: Junior Resident Medical Officer.

THE UNIVERSITY OF MELBOURNE: Demonstrator in Bio-Chemistry.

Medical Appointments: Important Notice.

MEDICAL practitioners are requested not to apply for any appointment referred to in the following table, without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, 429, Strand, London, W.C..

BRANCH.	APPOINTMENTS.
NEW SOUTH WALES: Honorary Secretary, 30 - 34, Elizabeth Street, Sydney	Australian Natives' Association Ashfield and District Friendly Societies' Dispensary Balmmain United Friendly Societies' Dispensary Friendly Society Lodges at Casino Leichhardt and Petersham Dispensary Manchester Unity Oddfellows' Medical Institute, Elizabeth Street, Sydney Marrickville United Friendly Societies' Dispensary North Sydney United Friendly Societies People's Prudential Benefit Society Phoenix Mutual Provident Society
	All Institutes or Medical Dispensaries Australian Prudential Association Proprietary, Limited Manchester Unity Independent Order of Oddfellows Mutual National Provident Club National Provident Association
VICTORIA: Honorary Secretary, Medical Society Hall, East Melbourne	Brisbane United Friendly Society Institute Stannary Hills Hospital
QUEENSLAND: Honorary Secretary, B.M.A. Building, Adelaide Street, Brisbane	Contract Practice Appointments at Renmark Contract Practice Appointments in South Australia
SOUTH AUSTRALIA: Honorary Secretary, 12, North Terrace, Adelaide	All Contract Practice Appointments in Western Australia
WESTERN AUSTRALIA: Honorary Secretary, Saint George's Terrace, Perth	Friendly Society Lodges, Wellington, New Zealand
NEW ZEALAND (WELLINGTON DIVISION): Honorary Secretary, Wellington	

Diary for the Month.

- MAR. 14.—Western Australian Branch, B.M.A.: Council.
 MAR. 13.—New South Wales Branch, B.M.A.: Medical Politics Committee; Organization and Science Committee.
 MAR. 15.—Victorian Branch, B.M.A.: Council.
 MAR. 20.—New South Wales Branch, B.M.A.: Council (Quarterly Meeting).
 MAR. 21.—Western Australian Branch, B.M.A.: Branch.
 MAR. 21.—South Sydney Medical Association, New South Wales: Annual Meeting.
 MAR. 22.—Brisbane Hospital for Sick Children: Clinical Meeting.
 MAR. 23.—New South Wales Branch, B.M.A.: Branch (Annual Meeting).
 MAR. 23.—Queensland Branch, B.M.A.: Council.
 MAR. 27.—New South Wales Branch, B.M.A.: Council; Election of Officers and Appointment of Standing Committees.
 MAR. 28.—Victorian Branch, B.M.A.: Council.
 MAR. 29.—South Australian Branch, B.M.A.: Branch.
 APR. 4.—Victorian Branch, B.M.A.: Branch.
 APR. 6.—Queensland Branch, B.M.A.: Branch.
 APR. 10.—New South Wales Branch, B.M.A.: Ethics Committee.

Editorial Notices.

MANUSCRIPTS forwarded to the office of this journal cannot under any circumstances be returned. Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary be stated. All communications should be addressed to "The Editor," THE MEDICAL JOURNAL OF AUSTRALIA, B.M.A. Building, 30-34, Elizabeth Street, Sydney. (Telephone: B. 4635.)

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